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# THORN

STEEL WINDOWS

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INDUSTRIAL  
CATALOGUE  
NUMBER F-S-6  
J. S. THORN  
COMPANY  
PHILADELPHIA  
NEW YORK  
BOSTON

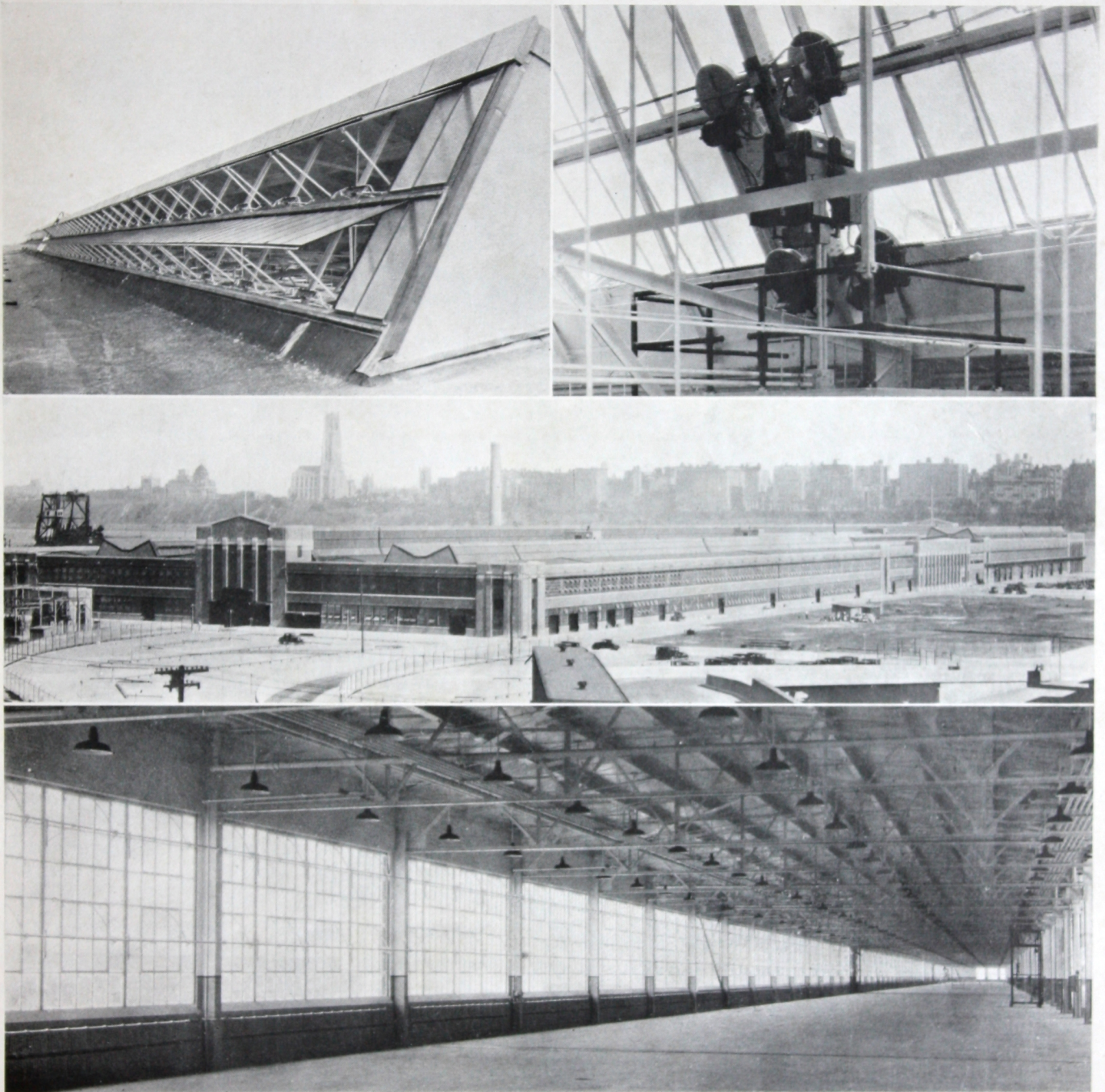


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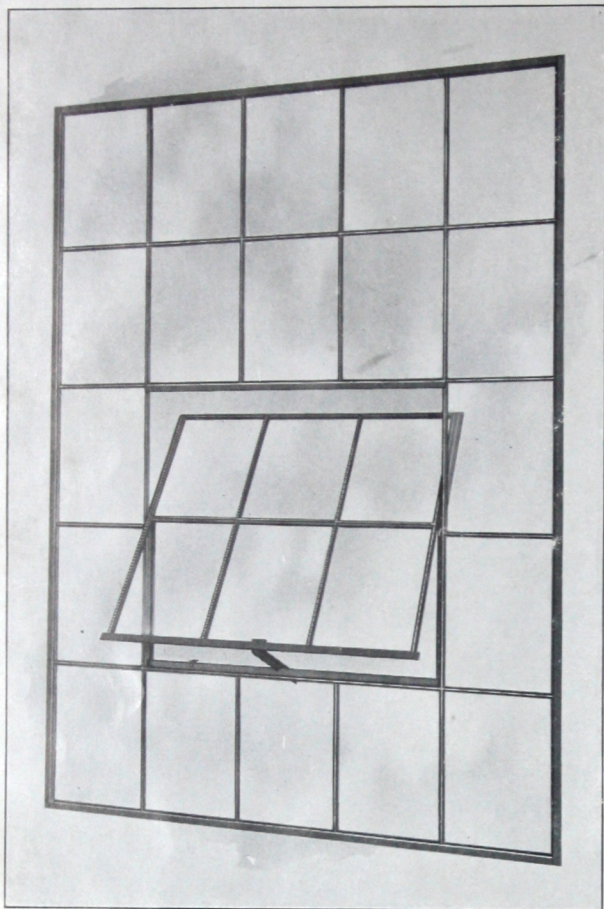
## THORN STEEL WINDOWS



FORD MOTOR COMPANY, EDGEWATER, N. J.  
ALBERT KAHN, DETROIT, ARCHITECT  
TURNER CONST. CO., NEW YORK, CONTRACTOR  
THORN INDUSTRIAL PRODUCTS USED:—  
90,000 SQ. FT. PIVOTED AND PROJECTED WINDOWS  
100,000 SQ. FT. CONTINUOUS TOP HUNG WINDOWS  
30,000 LIN. FT. TENSION AND RACK AND PINION OPERATORS  
WITH 106 MOTOR CONTROLS



## THORN PIVOTED WINDOWS



Thorn pivoted windows, of new billet rolled steel, constructed of solid sections, are designed for use in industrial buildings of all types. This type of window, simple in its construction, easy to operate and economical in cost, is universally acknowledged to be the most practical for sidewall construction for buildings of the industrial type.

The Thorn window is built not only to withstand the most severe wind pressure but also to retain its shape even though the handling in transportation may be somewhat careless. This is chiefly due to the construction at the joints. The muntin bar joints are welded, insuring rigidity. The bars are not broken or distorted to form the joint, therefore, their full original strength is maintained in the finished product.

The ventilators are weathertight, being double weath-

### Specifications

All windows except as otherwise noted shall be Thorn steel pivoted type as manufactured by J. S. Thorn Co., Philadelphia, Pa.

They shall be made of new billet steel sections approximately  $1\frac{3}{8}$  deep, having a cove moulding face.

All through muntin bars must be joined at intersections by neat, flush mitre joints electrically welded at four places along the mitre lines on the inside.

Ventilators shall be pivoted slightly above center, and shall be hung on strong steel pivots with steel pins. They shall be double weathered on all sides and weathering members shall be riveted to sash or vent bars.

Push bars shall be furnished for all vents within reach, and spring catch or cam latch (*specify which*) and chain for all vents out of reach, unless otherwise specified.

Window units shall be joined together by standard T bar mullions.

Spring wire glazing clips, four to each light, shall be furnished to hold glass in place.

Windows and mullions shall be given a priming coat at the factory of grey metallic paint.

ered at top, bottom and sides, and hung on strong steel pivots with steel pins.

We supply as standard equipment any of the vent fittings as shown in the catalog, Plate HP 6, Page 12, unless otherwise noted.

The windows are painted at the factory with a good priming coat of grey metallic paint but they should receive two coats of paint in the field after erection.

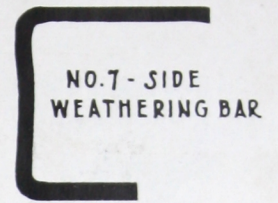
Thorn pivoted windows are easy to erect. They should be squared and trued to the openings, and if set in masonry, carefully grouted in place. Extreme care must be taken to see that grout does not interfere with the free operation of the ventilators. The ventilators should be adjusted and the hardware attached before glazing.





NO. 1  
MUNTIN BAR

NO. 9-BOTTOM  
WEATHERING BAR



NO. 7-SIDE  
WEATHERING BAR



NO. 8-VENTILATOR  
WEATHERING SECTION



NO. 20-STANDARD  
MULLION



NO. 3-STANDARD  
FRAME BAR



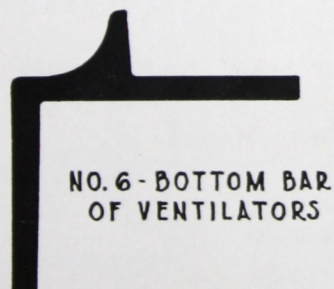
NO. 5-TOP BAR  
OF VENTILATORS



NO. 10  
GLAZING ANGLE



NO. 12-SPECIAL  
FRAME BAR



NO. 6-BOTTOM BAR  
OF VENTILATORS



NO. 21-MULLION



NO. 11-STANDARD  
FRAME BAR FOR  
ARCHITECTURAL  
PROJECTED WINDOW

**THORN**  
STEEL WINDOWS

STANDARD SECTIONS  
**PIVOTED AND PROJECTED WINDOWS**  
J.J. THORN CO.

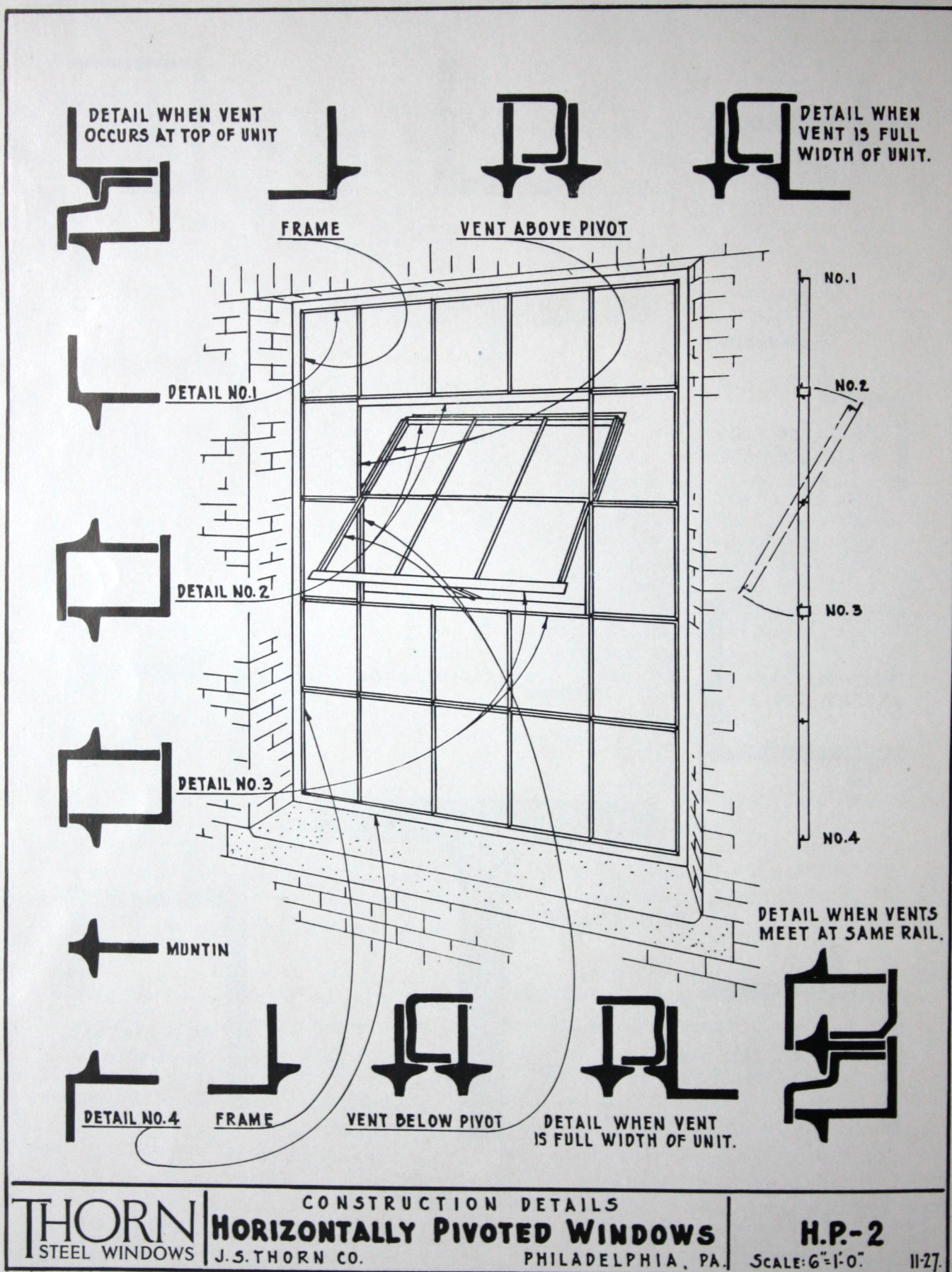
PHILADELPHIA, PA.

**H. P. - I**

SCALE: FULL SIZE

11-27







## STANDARD OPENING DIMENSIONS

| HEIGHT OF OPENINGS     |                |  |                         |  |  |
|------------------------|----------------|--|-------------------------|--|--|
| 12'' x 18''<br>GLASS   | LIGHTS<br>HIGH |  | 14'' x 20''<br>GLASS    |  |  |
| 1' 7 $\frac{1}{4}$ ''  | 1              |  | 1' 9 $\frac{1}{4}$ ''   |  |  |
| 3' 1 $\frac{5}{8}$ ''  | 2              |  | 3' 5 $\frac{5}{8}$ ''   |  |  |
| 4' 8''                 | 3              |  | 5' 2''                  |  |  |
| 6' 2 $\frac{3}{8}$ ''  | 4              |  | 6' 10 $\frac{3}{8}$ ''  |  |  |
| 7' 8 $\frac{3}{4}$ ''  | 5              |  | 8' 6 $\frac{3}{4}$ ''   |  |  |
| 9' 3 $\frac{1}{8}$ ''  | 6              |  | 10' 3 $\frac{1}{8}$ ''  |  |  |
| 10' 9 $\frac{1}{2}$ '' | 7              |  | 11' 11 $\frac{1}{2}$ '' |  |  |

| WIDTH OF OPENINGS       |   |                    |                         |                       |                         |
|-------------------------|---|--------------------|-------------------------|-----------------------|-------------------------|
| 12'' x 18''<br>GLASS    | COMMON TO BOTH<br>12'' x 18'' AND 14'' x 20'' GLASS |                    |                         |                       | 14'' x 20''<br>GLASS    |
|                         | LIGHTS<br>WIDE                                      | NUMBER OF<br>UNITS | ARRANGEMENT<br>OF UNITS | NUMBER OF<br>MULLIONS |                         |
| OPENING<br>DIMENSION    |   |                    |                         |                       | OPENING<br>DIMENSION    |
| 2' 1 $\frac{5}{8}$ ''   | 2   | 1                  | 2                       | NONE                  | 2' 5 $\frac{5}{8}$ ''   |
| 3' 2''                  | 3   | 1                  | 3                       | "                     | 3' 8''                  |
| 4' 2 $\frac{3}{8}$ ''   | 4   | 1                  | 4                       | "                     | 4' 10 $\frac{3}{8}$ ''  |
| 5' 2 $\frac{3}{4}$ ''   | 5   | 1                  | 5                       | "                     | 6' 0 $\frac{3}{4}$ ''   |
| 6' 3 $\frac{1}{8}$ ''   | 6   | 1                  | 6                       | "                     | 7' 3 $\frac{1}{8}$ ''   |
| 6' 6''                  | 6   | 2                  | 3, 3                    | 1                     | 7' 6''                  |
| 8' 6 $\frac{3}{4}$ ''   | 8   | 2                  | 4, 4                    | 1                     | 9' 10 $\frac{3}{4}$ ''  |
| 9' 10''                 | 9   | 3                  | 3, 3, 3                 | 2                     | 11' 4''                 |
| 10' 7 $\frac{1}{2}$ ''  | 10  | 2                  | 5, 5                    | 1                     | 12' 3 $\frac{1}{2}$ ''  |
| 10' 10 $\frac{3}{8}$ '' | 10  | 3                  | 3, 4, 3                 | 2                     | 12' 6 $\frac{3}{8}$ ''  |
| 11' 10 $\frac{3}{4}$ '' | 11  | 3                  | 3, 5, 3                 | 2                     | 13' 8 $\frac{3}{4}$ ''  |
| 11' 10 $\frac{3}{4}$ '' | 11  | 3                  | 4, 3, 4                 | 2                     | 13' 8 $\frac{3}{4}$ ''  |
| 12' 8 $\frac{1}{4}$ ''  | 12  | 2                  | 6, 6                    | 1                     | 14' 8 $\frac{1}{4}$ ''  |
| 12' 11 $\frac{1}{8}$ '' | 12  | 3                  | 4, 4, 4                 | 2                     | 14' 11 $\frac{1}{8}$ '' |
| 13' 11 $\frac{1}{2}$ '' | 13  | 3                  | 4, 5, 4                 | 2                     | 16' 1 $\frac{1}{2}$ ''  |
| 13' 11 $\frac{1}{2}$ '' | 13  | 3                  | 5, 3, 5                 | 2                     | 16' 1 $\frac{1}{2}$ ''  |
| 14' 11 $\frac{1}{8}$ '' | 14  | 3                  | 4, 6, 4                 | 2                     | 17' 3 $\frac{1}{8}$ ''  |
| 14' 11 $\frac{1}{8}$ '' | 14  | 3                  | 5, 4, 5                 | 2                     | 17' 3 $\frac{1}{8}$ ''  |
| 15' 2 $\frac{3}{4}$ ''  | 14  | 4                  | 3, 4, 4, 3              | 3                     | 17' 6 $\frac{3}{4}$ ''  |
| 16' 0 $\frac{1}{4}$ ''  | 15  | 3                  | 5, 5, 5                 | 2                     | 18' 6 $\frac{1}{4}$ ''  |
| 16' 0 $\frac{1}{4}$ ''  | 15  | 3                  | 6, 3, 6                 | 2                     | 18' 6 $\frac{1}{4}$ ''  |
| 17' 0 $\frac{5}{8}$ ''  | 16  | 3                  | 5, 6, 5                 | 2                     | 19' 8 $\frac{5}{8}$ ''  |
| 17' 0 $\frac{5}{8}$ ''  | 16  | 3                  | 6, 4, 6                 | 2                     | 19' 8 $\frac{5}{8}$ ''  |
| 17' 3 $\frac{1}{2}$ ''  | 16  | 4                  | 4, 4, 4, 4              | 3                     | 19' 11 $\frac{1}{2}$ '' |
| 18' 1''                 | 17  | 3                  | 6, 5, 6                 | 2                     | 20' 11''                |
| 19' 1 $\frac{3}{8}$ ''  | 18  | 3                  | 6, 6, 6                 | 2                     | 22' 1 $\frac{3}{8}$ ''  |
| 19' 4 $\frac{1}{4}$ ''  | 18  | 4                  | 3, 6, 6, 3              | 3                     | 22' 4 $\frac{1}{4}$ ''  |
| 19' 4 $\frac{1}{4}$ ''  | 18  | 4                  | 4, 5, 5, 4              | 3                     | 22' 4 $\frac{1}{4}$ ''  |
| 20' 7 $\frac{1}{2}$ ''  | 19  | 5                  | 5, 3, 3, 3, 5           | 4                     | 23' 9 $\frac{1}{2}$ ''  |
| 21' 5''                 | 20  | 4                  | 5, 5, 5, 5              | 3                     | 24' 9''                 |
| 21' 5''                 | 20  | 4                  | 4, 6, 6, 4              | 3                     | 24' 9''                 |
| 21' 7 $\frac{7}{8}$ ''  | 20  | 5                  | 4, 4, 4, 4, 4           | 4                     | 24' 11 $\frac{7}{8}$ '' |
| 22' 8 $\frac{1}{4}$ ''  | 21  | 5                  | 4, 4, 5, 4, 4           | 4                     | 26' 2 $\frac{1}{4}$ ''  |
| 22' 8 $\frac{1}{4}$ ''  | 21  | 5                  | 3, 5, 5, 5, 3           | 4                     | 26' 2 $\frac{1}{4}$ ''  |
| 23' 5 $\frac{3}{4}$ ''  | 22  | 4                  | 5, 6, 6, 5              | 3                     | 27' 1 $\frac{3}{4}$ ''  |
| 23' 8 $\frac{5}{8}$ ''  | 22  | 5                  | 5, 4, 4, 4, 5           | 4                     | 27' 4 $\frac{5}{8}$ ''  |
| 23' 11 $\frac{1}{2}$ '' | 22  | 6                  | 3, 4, 4, 4, 4, 3        | 5                     | 27' 7 $\frac{1}{2}$ ''  |
| 24' 9''                 | 23  | 5                  | 4, 5, 5, 5, 4           | 4                     | 28' 7''                 |
| 25' 6 $\frac{1}{2}$ ''  | 24  | 4                  | 6, 6, 6, 6              | 3                     | 29' 6 $\frac{1}{2}$ ''  |
| 25' 9 $\frac{3}{8}$ ''  | 24  | 5                  | 3, 6, 6, 6, 3           | 4                     | 29' 9 $\frac{3}{8}$ ''  |
| 26' 0 $\frac{1}{4}$ ''  | 24  | 6                  | 4, 4, 4, 4, 4, 4        | 5                     | 30' 0 $\frac{1}{4}$ ''  |
| 26' 9 $\frac{3}{4}$ ''  | 25  | 5                  | 5, 5, 5, 5, 5           | 4                     | 30' 11 $\frac{3}{4}$ '' |
| 27' 10 $\frac{1}{8}$ '' | 26  | 5                  | 5, 5, 6, 5, 5           | 4                     | 32' 2 $\frac{1}{8}$ ''  |
| 28' 1''                 | 26  | 6                  | 5, 4, 4, 4, 4, 5        | 5                     | 32' 5''                 |
| 28' 1''                 | 26  | 6                  | 3, 5, 5, 5, 5, 3        | 5                     | 32' 5''                 |
| 28' 10 $\frac{1}{2}$ '' | 27  | 5                  | 6, 5, 5, 5, 6           | 4                     | 33' 4 $\frac{1}{2}$ ''  |
| 29' 10 $\frac{1}{8}$ '' | 28  | 5                  | 5, 6, 6, 6, 5           | 4                     | 34' 6 $\frac{1}{8}$ ''  |
| 30' 1 $\frac{3}{4}$ ''  | 28  | 6                  | 4, 5, 5, 5, 5, 4        | 5                     | 34' 9 $\frac{3}{4}$ ''  |
| 30' 11 $\frac{1}{4}$ '' | 29  | 5                  | 6, 6, 5, 6, 6           | 4                     | 35' 9 $\frac{1}{4}$ ''  |

The most economical layouts and the best service will be obtained through the use of standard window units which may be combined to form a great variety of widths, and there are very few cases where openings will not lend themselves to the use of standard units.

Standard units are made with uniform punching in the jamb members which match the slots in standard mullion bars, and any combination of standard units may be obtained by joining the windows together with standard mullions and the opening size can be determined by adding the sizes of the window units together, plus two inches for each mullion.

The table opposite gives a variety of window combinations and the resultant opening dimensions.

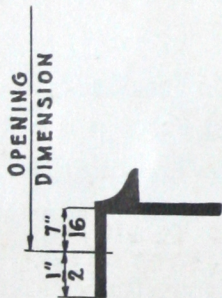
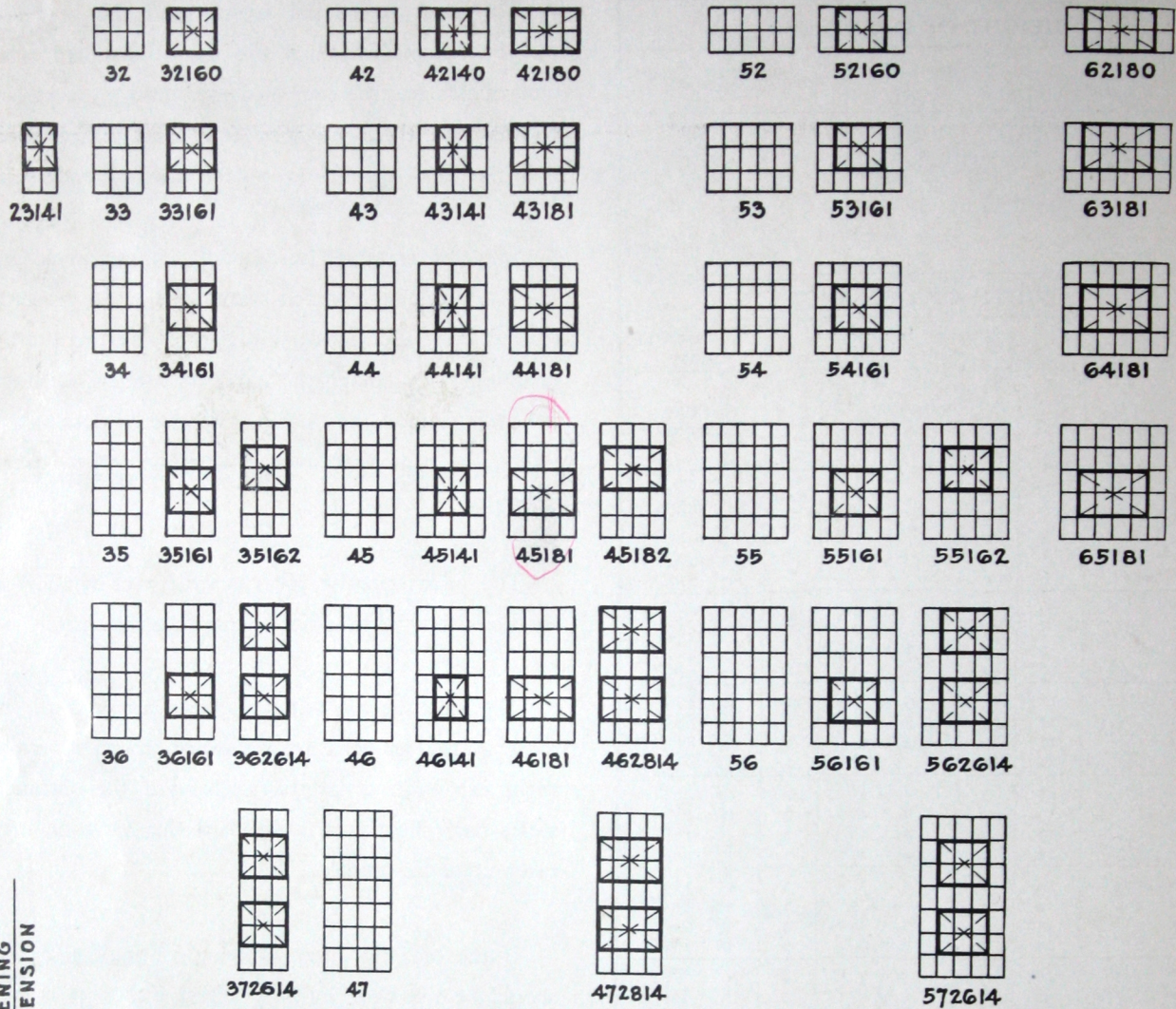
The slots in the window jambs are vertical, while those in the mullions are horizontal, thereby permitting slight expansion or contraction, and if the opening size varies only slightly from standard this variation may be taken up at the mullions.

If the openings after allowing for mullion expansion should be too wide by only a few inches, it is well to add jamb plates to the sash as shown in detail No. 41, Plate HP 10, Page 15, which are furnished at a slight extra cost.

Heights greater than those shown in the table may also be obtained by placing units one above the other and using a horizontal mullion between, as shown on detail plate HP 13, Page 10. The design and size of the members selected for the horizontal mullion should be determined by the structural engineer. These horizontal mullion members should be strong enough to carry the entire weight of the windows above and to resist the wind pressure to which they may be subjected. Our engineers will be glad to determine the size of these members upon request.



# THORN PIVOTED WINDOWS



TYPICAL SECTION  
AT FRAME

|          |          |          |          |
|----------|----------|----------|----------|
| 12<br>18 | 12<br>18 | 12<br>18 | 12<br>18 |
| 11<br>17 | 12<br>17 | 12<br>17 | 11<br>17 |
| 11<br>17 | 12<br>17 | 12<br>17 | 11<br>17 |
| 12<br>18 | 12<br>18 | 12<br>18 | 12<br>18 |

|          |          |          |          |
|----------|----------|----------|----------|
| 14<br>20 | 14<br>20 | 14<br>20 | 14<br>20 |
| 13<br>19 | 14<br>19 | 14<br>19 | 13<br>19 |
| 13<br>19 | 14<br>19 | 14<br>19 | 13<br>19 |
| 14<br>20 | 14<br>20 | 14<br>20 | 14<br>20 |

| OPENING DIMENSIONS |           |            |                |            |             |
|--------------------|-----------|------------|----------------|------------|-------------|
| LIGHTS<br>WIDE     | S=12"     | T=14"      | LIGHTS<br>HIGH | S=18"      | T=20"       |
| 2                  | 2'-1 5/8" | 2'-5 5/8"  | 1              | 1'-7 1/4"  | 1'-9 1/4"   |
| 3                  | 3'-2"     | 3'-8"      | 2              | 3'-1 5/8"  | 3'-5 5/8"   |
| 4                  | 4'-2 3/8" | 4'-10 3/8" | 3              | 4'-8"      | 5'-2"       |
| 5                  | 5'-2 3/4" | 6'-0 3/4"  | 4              | 6'-2 3/8"  | 6'-10 3/8"  |
| 6                  | 6'-3 1/8" | 7'-3 1/8"  | 5              | 7'-8 3/4"  | 8'-6 3/4"   |
|                    |           |            | 6              | 9'-3 1/8"  | 10'-3 1/8"  |
|                    |           |            | 7              | 10'-9 1/2" | 11'-11 1/2" |

GLASS IN OUTSIDE LIGHTS OF  
VENTS TO BE 1" LESS THAN THE  
SPECIFIED SIZE.  
S = 12" x 18" GLASS } STANDARD SIZE  
T = 14" x 20" GLASS }

ALL TYPES SHOWN ARE  
PUNCHED FOR MULLIONS.  
TO OBTAIN WIDTH OF OPENING  
ADD 2" FOR EACH MULLION.

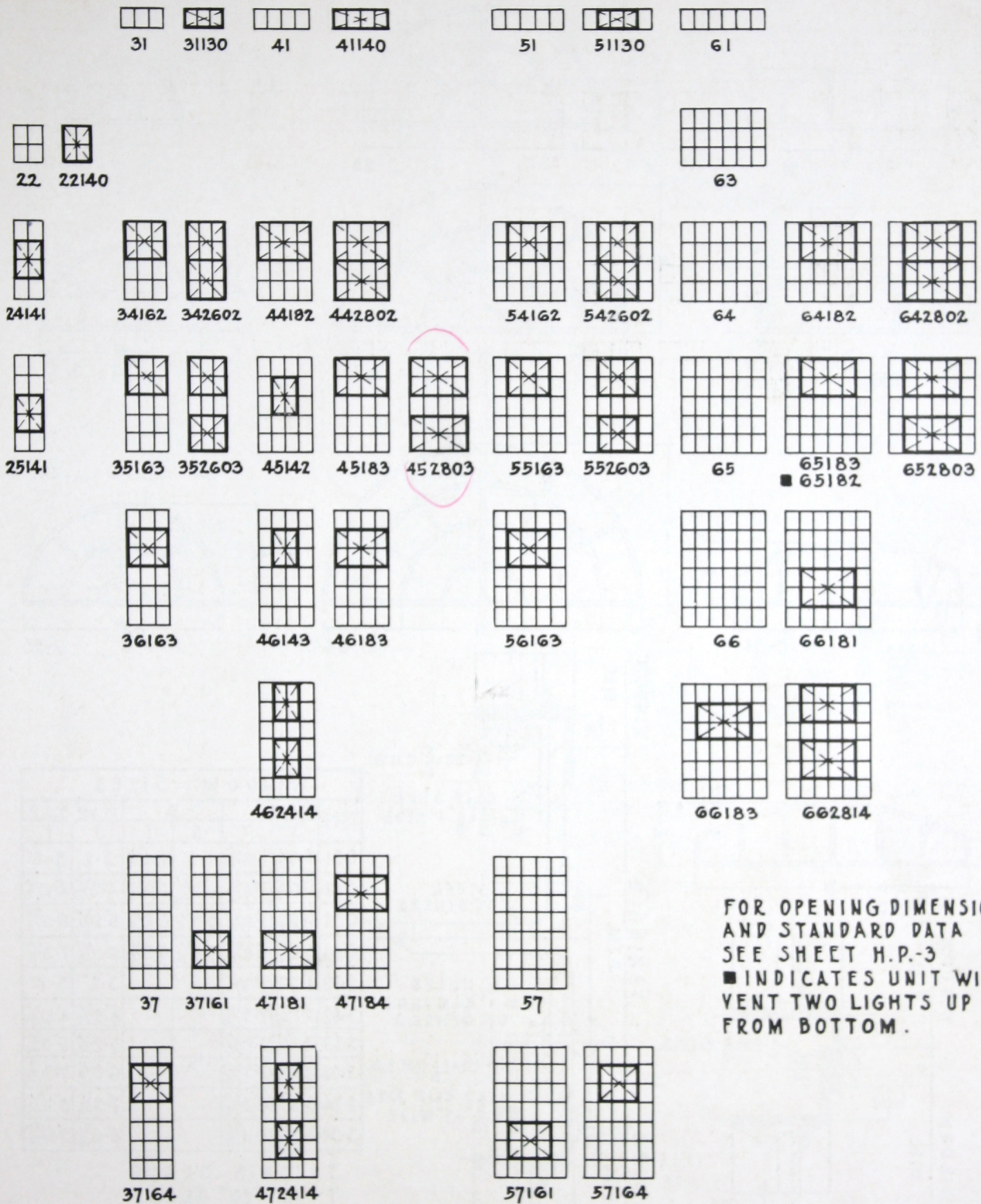
**THORN**  
STEEL WINDOWS

STANDARD TYPES AND SIZES  
**HORIZONTALLY PIVOTED WINDOWS**  
J.S. THORN CO.  
PHILADELPHIA, PA.

**H.P.-3**

11-27.





FOR OPENING DIMENSION  
AND STANDARD DATA  
SEE SHEET H.P.-3  
■ INDICATES UNIT WITH  
VENT TWO LIGHTS UP  
FROM BOTTOM.

**THORN**  
STEEL WINDOWS

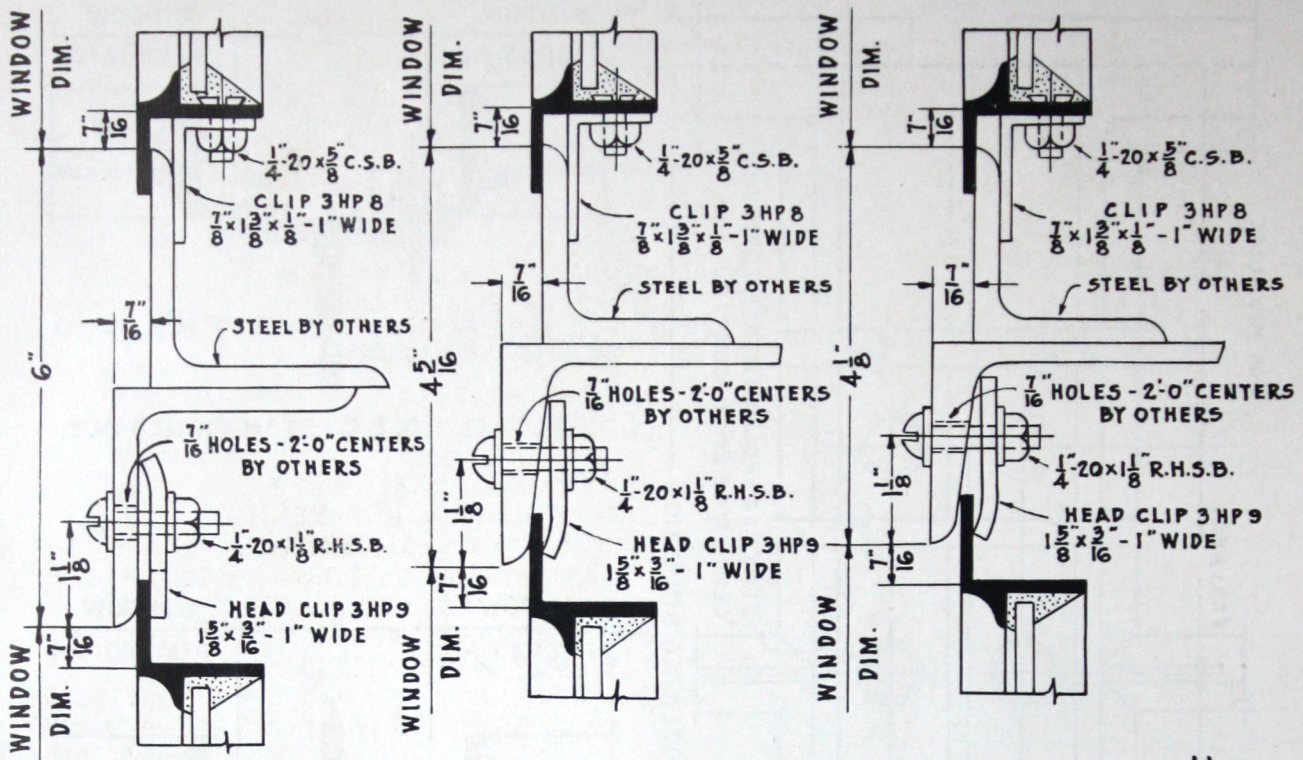
NEAR STANDARD TYPES AND SIZES  
**HORIZONTALLY PIVOTED WINDOWS**  
J.S. THORN CO. PHILADELPHIA, PA.

**H.P.-4**

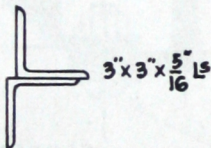
11-27



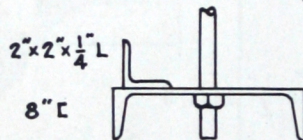
# THORN PIVOTED WINDOWS



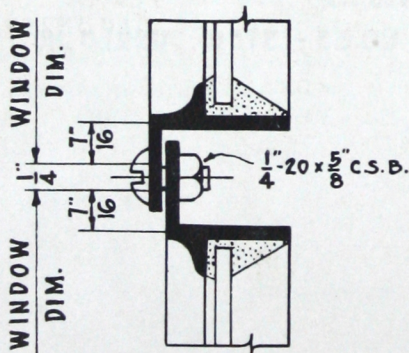
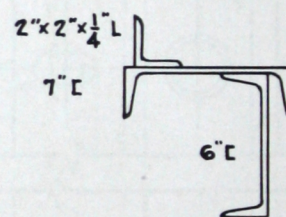
DETAIL NO. 53 - 2<sup>1</sup>/<sub>2</sub>"



DETAIL NO. 55 - 1<sup>1</sup>/<sub>2</sub>"



DETAIL NO. 56 - 1<sup>1</sup>/<sub>2</sub>"



DETAIL NO. 57

DIMENSIONS OF STRUCTURAL MEMBERS TO BE DETERMINED BY STEEL CONTRACTOR ACCORDING TO SURFACE AREA OF WINDOWS.

ALL STRUCTURAL MEMBERS TO BE FURNISHED BY OTHERS.

**THORN**  
STEEL WINDOWS

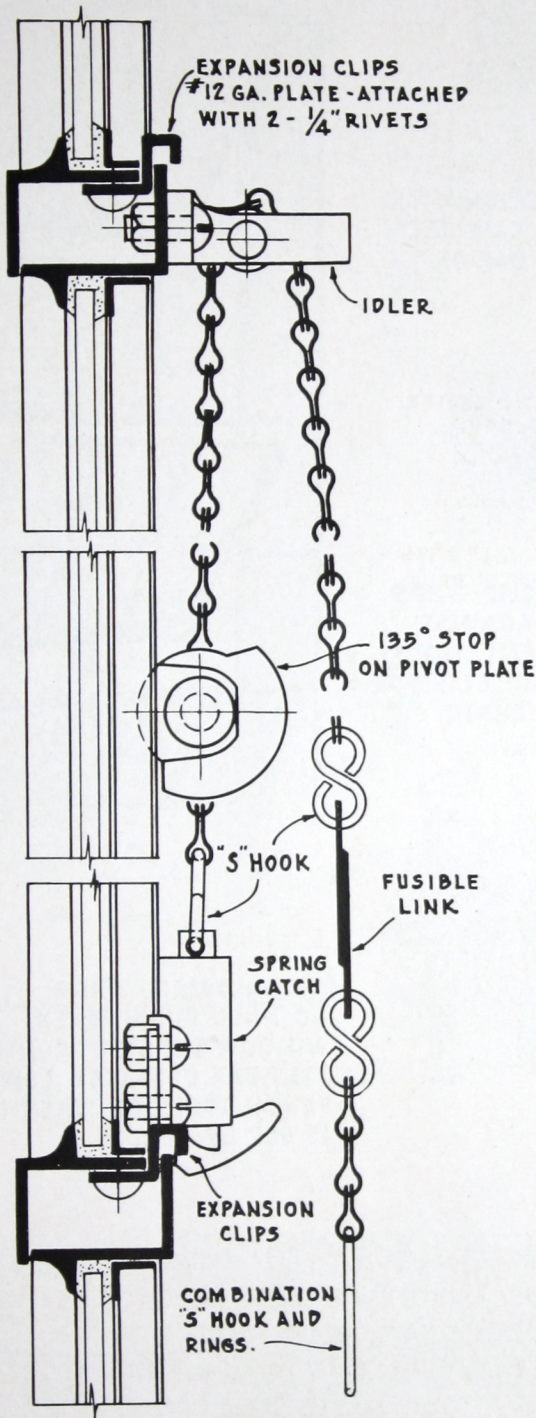
STANDARD HORIZONTAL MULLION  
**PIVOTED AND COMM. PROJ. WINDOWS**  
J. S. THORN CO.

**H.P.-13**

PHILADELPHIA, PA. SCALE: 6"=1'-0"

11-27





WINDOWS REQUIRING UNDERWRITER'S LABEL  
FURNISHED ONLY WHEN SPECIFIED AND  
AS AN EXTRA.

BELOW ARE GENERAL REQUIREMENTS FOR  
UNDERWRITER'S TYPE WINDOWS:

NO UNIT SHALL EXCEED 7'-0" IN WIDTH AND  
12'-0" IN HEIGHT.

VENTILATORS SHALL NOT EXCEED 5'-0" IN  
WIDTH AND 4'-0" IN HEIGHT.

THE EXPOSED GLASS AREA, MEASURED FROM  
TOE TO TOE OF GLAZING ANGLES, SHALL  
NOT EXCEED 350 SQUARE INCHES.

NOT MORE THAN TWO VENTS SHALL BE IN A  
SINGLE WINDOW UNIT.

ALL WINDOWS ARRANGED FOR 100% VENTILA-  
TION MUST NOT EXCEED A MAXIMUM AREA  
OF 3000 SQUARE INCHES WITH NEITHER  
DIMENSION GREATER THAN 5'-0".

VENTILATORS MUST BE PIVOTED ABOVE  
CENTER.

VENTILATOR HARDWARE MUST CONFORM  
TO THE RULES OF THE LOCAL BOARD.

SPRING CATCH WITH FUSIBLE LINK AND  
CHAIN IS UNIVERSALLY ACCEPTED, BUT  
SOME LOCAL BOARDS WILL PERMIT THE  
USE OF PUSH BAR OR CAM LATCH AND CHAIN.

THE CENTER LINE OF EXPANSION CLIPS  
SHALL NOT BE MORE THAN 8 7/8" FROM  
GLASS LINE OF VENT. TWO LOCATED ON  
THE TOP AND BOTTOM BAR OF EACH VENT.

**THORN**  
STEEL WINDOWS

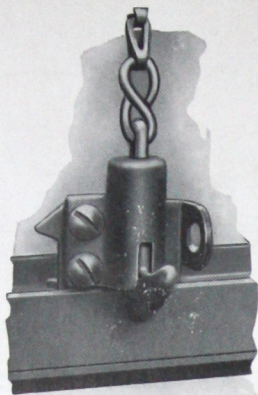
CONSTRUCTION DETAILS - UNDERWRITER'S TYPE  
**HORIZONTALLY PIVOTED WINDOWS**  
J.S. THORN CO. PHILADELPHIA, PA.

**H.P.-14**

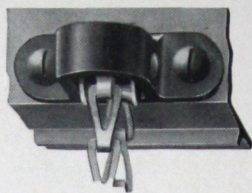
SCALE: 6"=1'-0"

11-27

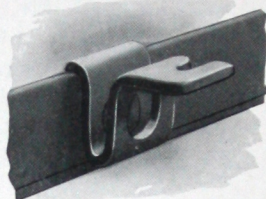




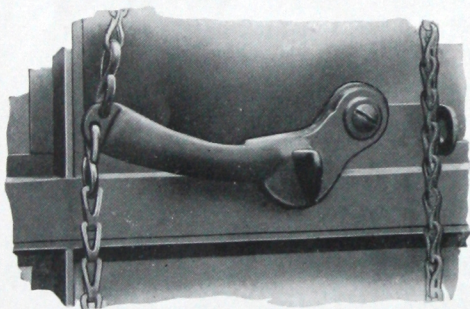
① SPRING CATCH-7 HP1  
FOR VENTILATORS OUT OF  
REACH, WHERE AUTOMATIC  
CLOSING IS DESIRED.



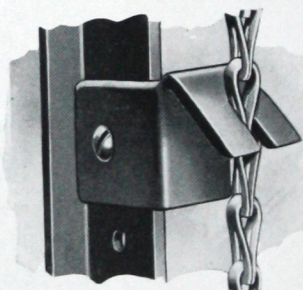
③ IDLER-7 HP2  
USED IN CONJUNCTION WITH  
SPRING CATCH OR CAM LATCH.  
ATTACHES TO TOP BAR OF  
VENTILATOR.



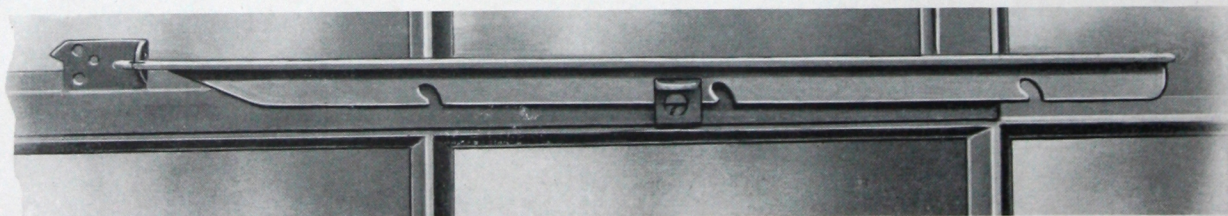
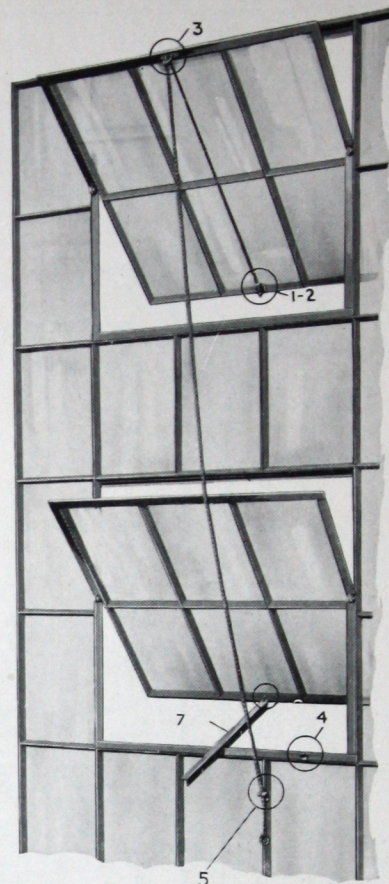
④ STAY AND CHAIN CLIP-3 HP5  
TO HOLD STAY BAR AGAINST  
WINDOW WHEN VENTILATOR IS  
CLOSED AND AS CHAIN CLIP FOR  
UPPER VENTILATOR CHAIN.



② CAM LATCH 5 HP1  
FOR VENTILATORS OUT OF  
REACH, WHERE NON-AUTOMATIC  
CLOSING IS DESIRED.



⑤ CHAIN CLIP - 3 HP6  
TO HOLD CHAIN WHEN  
WINDOW DOES NOT CONTAIN  
STAY BAR OPERATED LOWER  
VENTILATOR, OR WHEN IT  
IS OUT OF REACH.



⑦ PUSH BAR  
FOR VENTILATORS  
WITHIN REACH.

3 HP1 - 18" LONG  
3 HP2 - 20" LONG  
3 HP3 - 22" LONG  
3 HP4 - 24" LONG

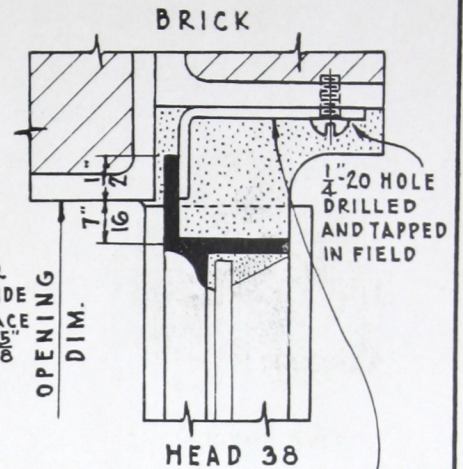
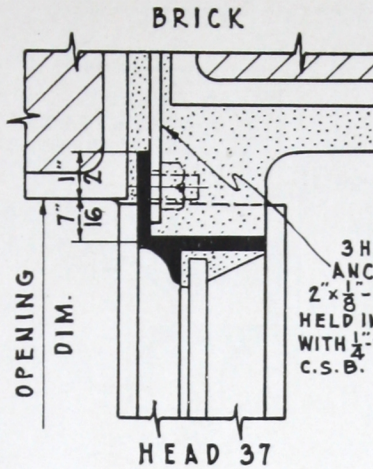
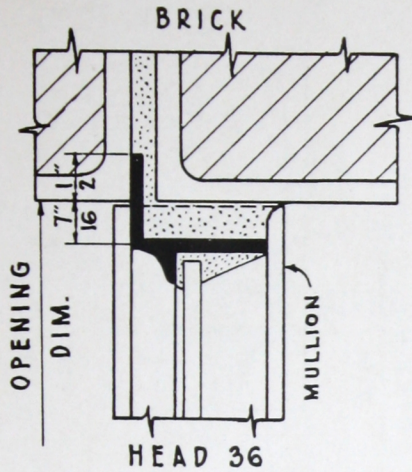
**THORN**  
STEEL WINDOWS

STANDARD HARDWARE APPLICATION  
**HORIZONTALLY PIVOTED WINDOWS**  
J.S.THORN CO. PHILADELPHIA, PA.

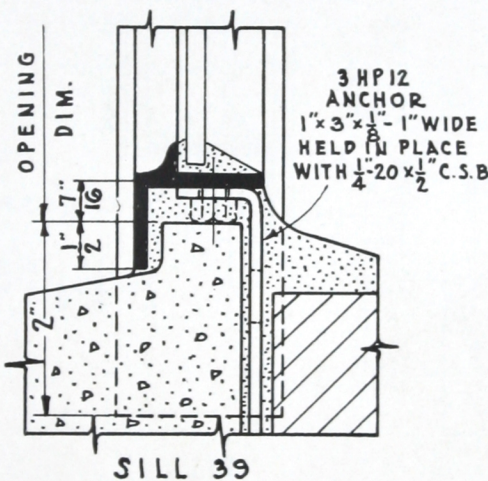
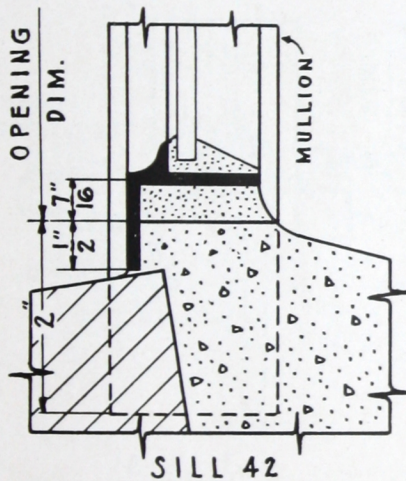
**H.P.-6**

11-27



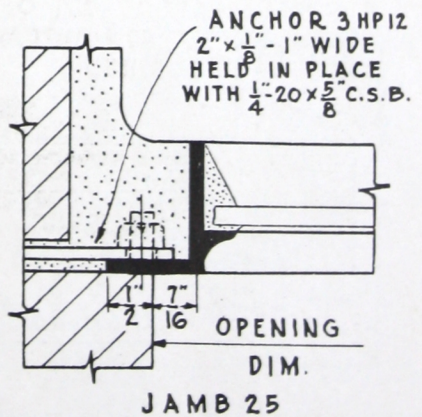
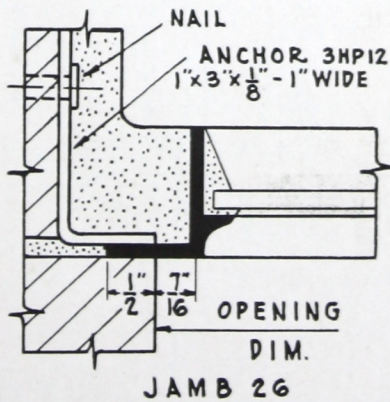
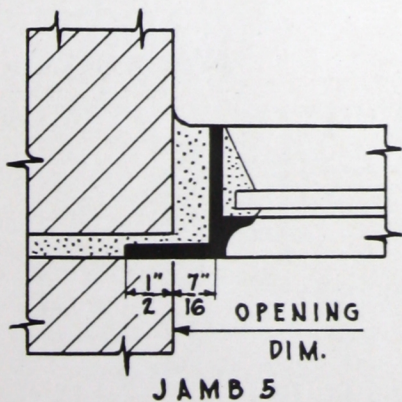


ANCHOR 3" x 1/8" - BENT  
IN FIELD AND SPACED  
@ 2'-0" CENTERS



USED IN ALL CASES  
WHERE STEEL LINTEL  
ANGLES ARE CLOSE  
TOGETHER.

WE RECOMMEND  
DETAILS NO. 36 OR  
NO. 37 WHENEVER  
POSSIBLE TO ELIMINATE  
NECESSITY OF FIELD  
DRILLING AND TAPPING.



**THORN**  
STEEL WINDOWS

INSTALLATION DETAILS  
**PIVOTED AND COMM. PROJ. WINDOWS**  
J. S. THORN CO.

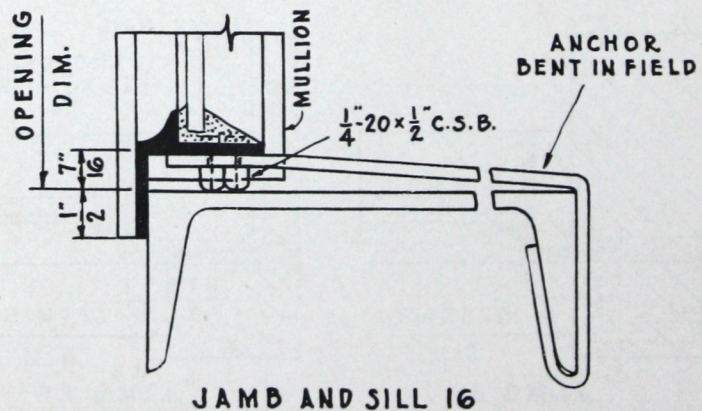
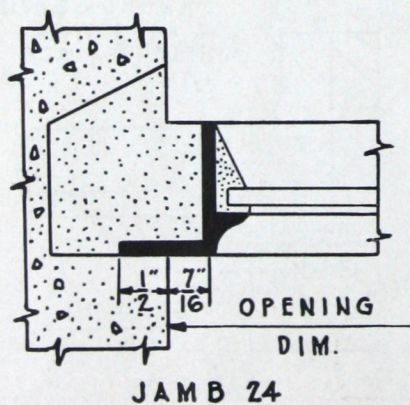
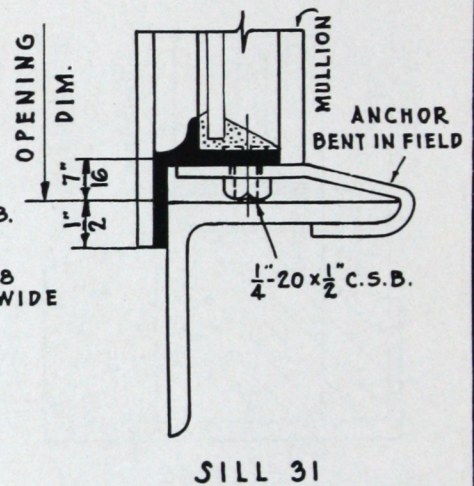
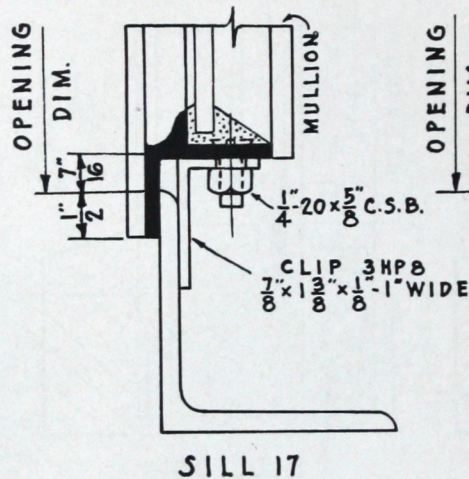
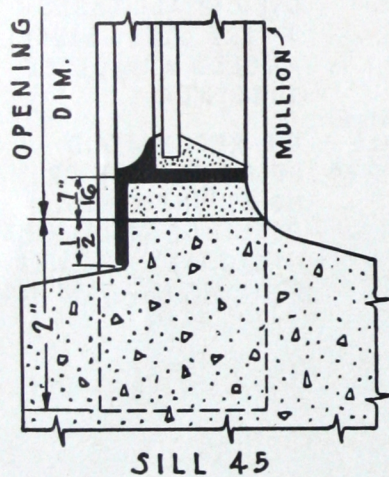
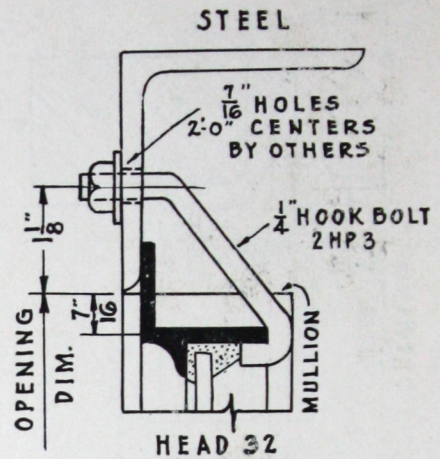
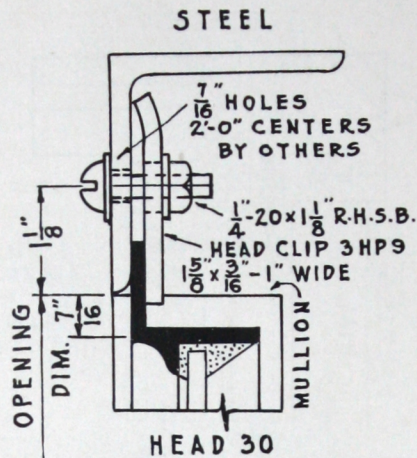
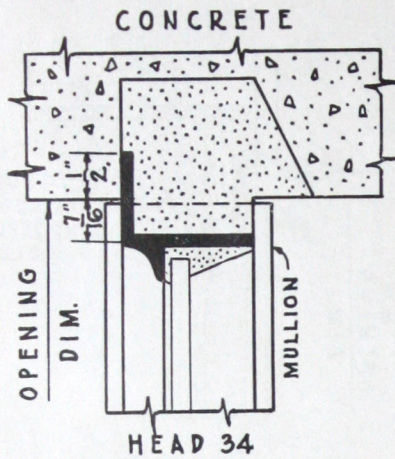
PHILADELPHIA, PA.

**H.P.-8**

SCALE: 6" = 1'-0"

11-27





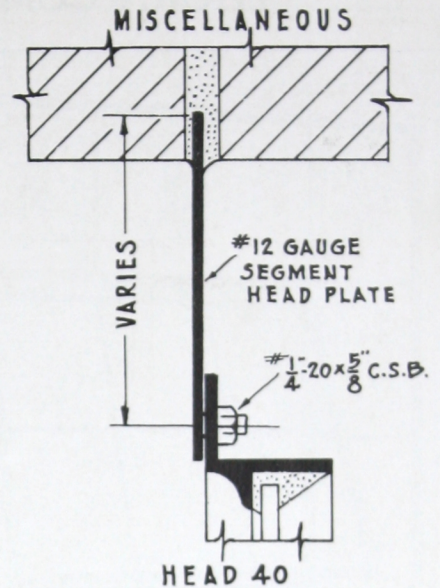
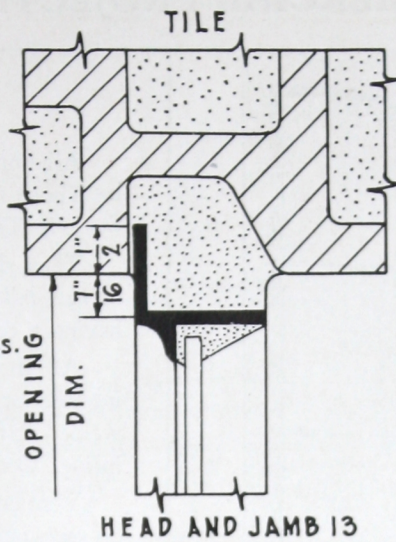
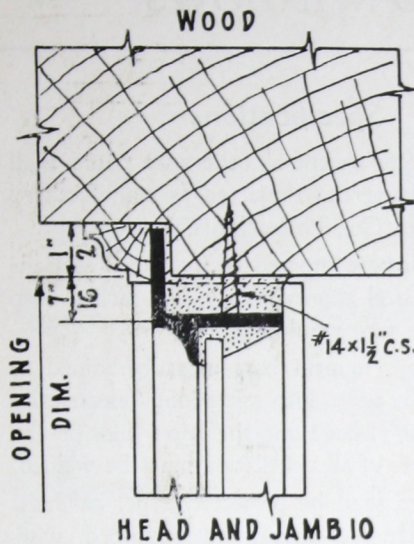
**THORN**  
STEEL WINDOWS

INSTALLATION DETAILS  
**PIVOTED AND COMM. PROJ. WINDOWS**  
J.S. THORN CO. PHILADELPHIA, P.A.

**H.P.-9**  
SCALE: 6"=1'-0"

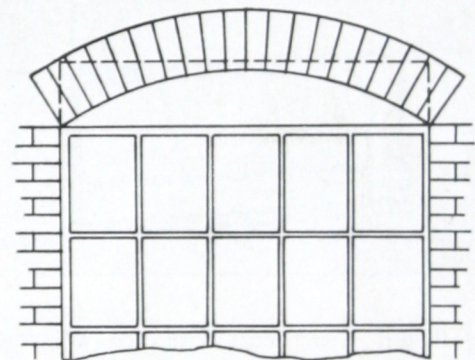
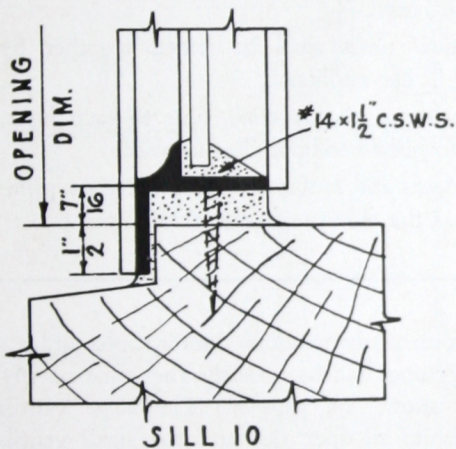
11-27



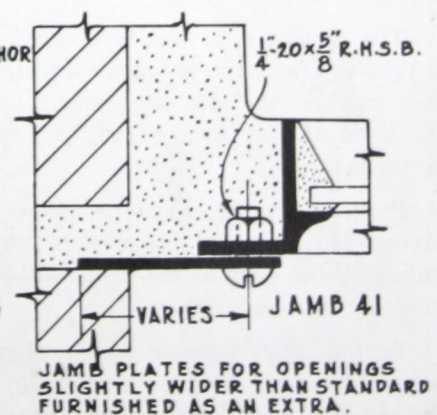
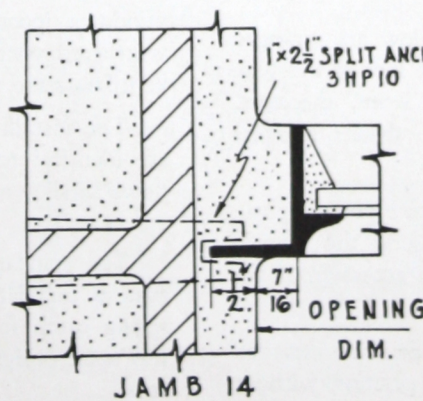
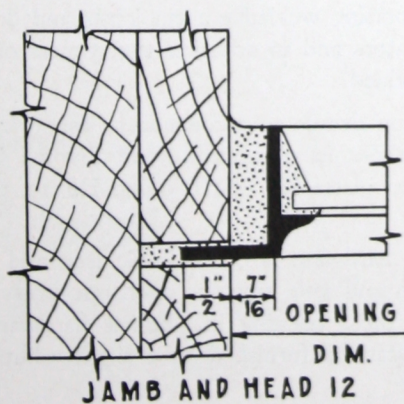


FOR OPENINGS NOT EXCEEDING 4'-8" WIDE.  
FOR OPENINGS OVER 4'-8" WIDE USE DETAILS NO. 36 AND NO. 37.

FOR SILL USE DETAIL NO. 42.



RECTANGULAR PLATE FOR SEGMENT HEAD OPENINGS - ALL PLATES CUT SQUARE UNLESS OTHERWISE SPECIFIED.



JAMB PLATES FOR OPENINGS SLIGHTLY WIDER THAN STANDARD FURNISHED AS AN EXTRA.

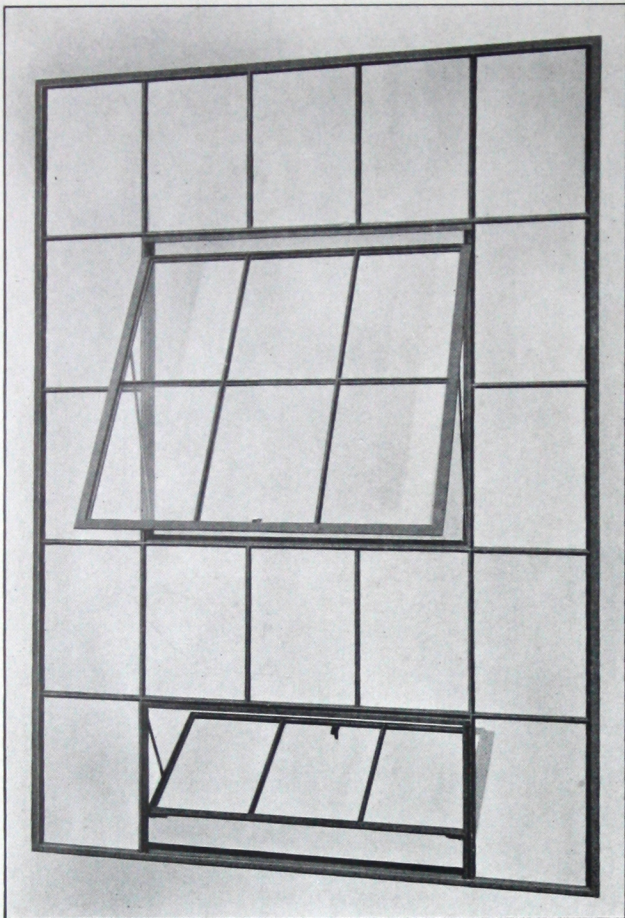
**THORN**  
STEEL WINDOWS

INSTALLATION DETAILS  
**PIVOTED AND COMM. PROJ. WINDOWS**  
J.S. THORN CO. PHILADELPHIA, PA.

**H.P.-10**  
SCALE: 6"=1'-0" 11-27



## THORN COMMERCIAL PROJECTED WINDOWS



The Thorn Commercial Projected Window is an economical office window designed for use in industrial building offices, schools, hospitals and buildings of like character where screens and shades are necessary.

It is made of the same *new billet* steel members as the Thorn Pivoted Window.

The ventilators in this type of window are arranged to open in or out and project beyond the face of the window only on the side on which they open, therefore, the application of screens and window shades presents no problem.

Projected ventilators may be opened to a point slightly beyond the horizontal plane, thus bringing the outside surface of the glass in the vents within access from the inside for cleaning.

Friction shoes together with steel side arms attached to each ventilator hold the vent in any position without the use of additional stays or supports.

The windows are made in standard and near standard unit sizes as shown on plates CP 2 and CP 3, pages 18 and 19, and these may be joined together with standard

### Specifications

All windows except as otherwise noted shall be Thorn Commercial Projected as manufactured by J. S. Thorn Co., Philadelphia, Pa.

They shall be composed of industrial sections of *new billet steel* approximately  $1\frac{3}{8}$  inches deep having a cove face moulding.

All through muntin bars must be joined at intersections by neat, flush mitre joints electrically welded at four places along the mitre lines on the inside. Corners of all ventilators must be welded.

Ventilators shall be projected type, balanced on substantial steel arms and equipped with bronze friction shoes and spring adjusters.

Malleable iron vent hardware consisting of cam latch for vents opening out and spring catch for those opening in shall be included unless otherwise noted.

Window units shall be joined together by standard T bar mullions.

Spring wire glazing clips, four to each light, shall be furnished to hold glass in place.

Windows and mullions shall be given a priming coat at the factory of grey metallic paint.

mullions to form many window combinations and a great variety of opening widths, exactly the same as Pivoted Windows as shown on page 5. The large ventilators in standard units all open out and the small ventilators open in.

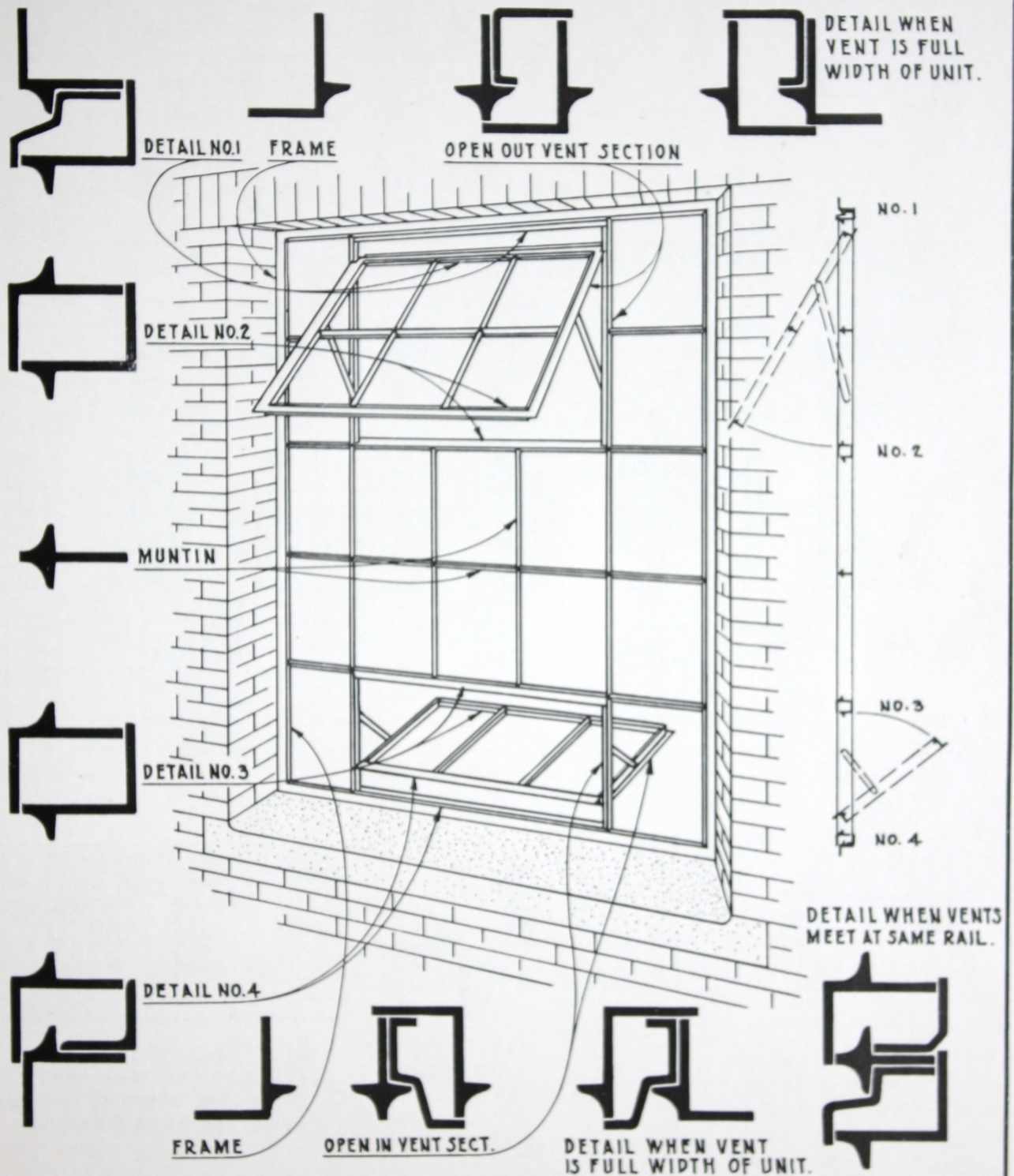
The construction is similar to that of Thorn pivoted windows, incorporating welded muntin joints and double weathered ventilators and in addition the corners of the ventilators are welded.

The installation details to accommodate this window are identical to those in connection with Pivoted Windows as shown on plates HP 8, HP 9 and HP 10, pages 13, 14 and 15.

The standard hardware is of malleable iron and consists of cam latch and pole ring for open out vents and spring catch for those opening in. Bronze hardware of the same design can be furnished at a slight additional cost.

Commercial Projected Window may be furnished bearing the label of the Underwriters' Laboratories provided they are kept within the limits prescribed by the Underwriters.





**THORN**  
STEEL WINDOWS

CONSTRUCTION DETAILS  
**COMMERCIAL PROJECTED WINDOWS**  
J.S. THORN CO.

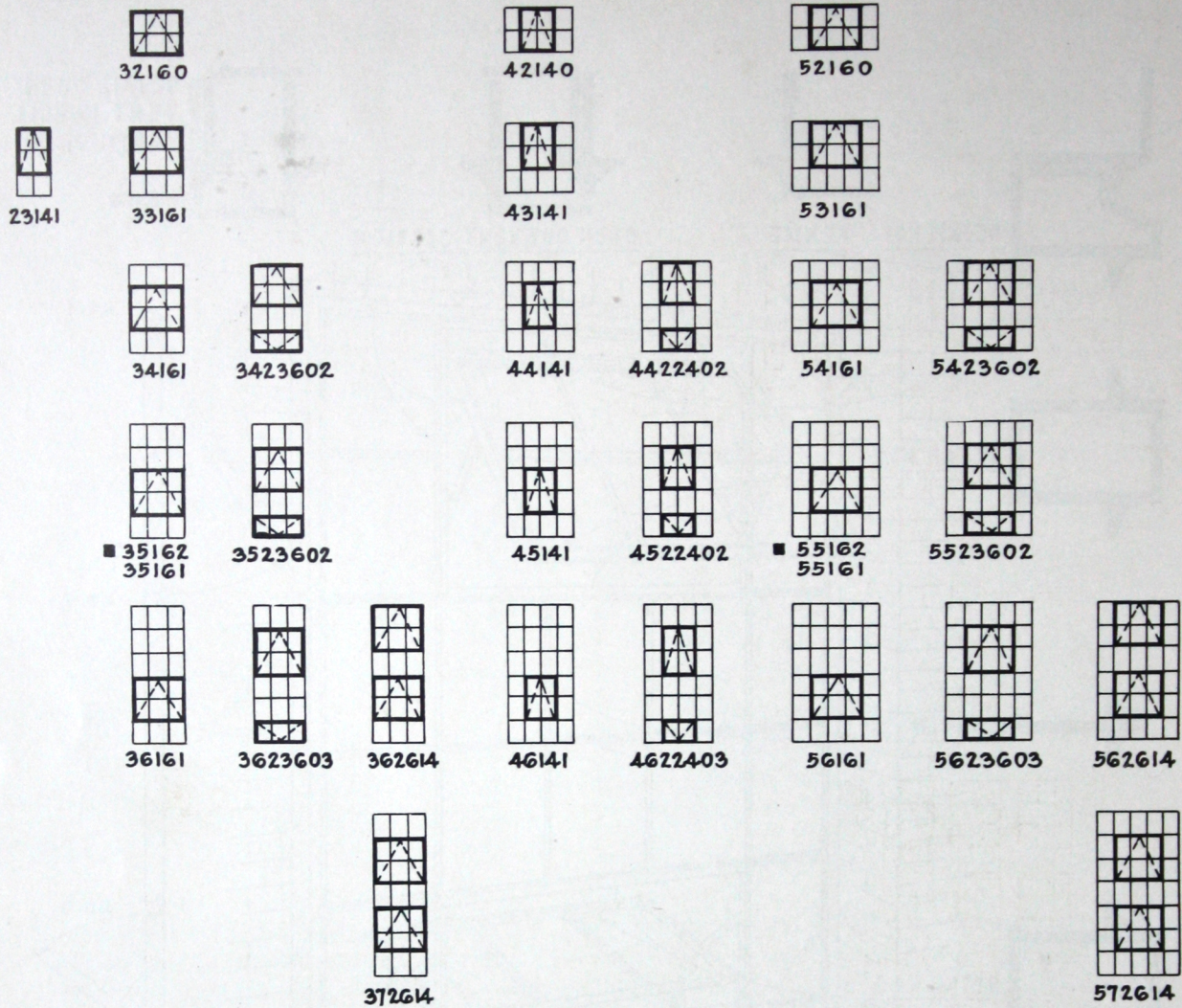
PHILADELPHIA, PA.

**C.P.-1**

SCALE: 6"=1'-0"

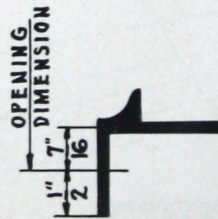
11-27





|    |    |    |    |
|----|----|----|----|
| 12 | 12 | 12 | 12 |
| 18 | 18 | 18 | 18 |
| 12 | 11 | 11 | 12 |
| 18 | 17 | 17 | 18 |
| 12 | 11 | 11 | 12 |
| 18 | 17 | 17 | 18 |
| 12 | 12 | 12 | 12 |
| 18 | 18 | 18 | 18 |

|    |    |    |    |
|----|----|----|----|
| 14 | 14 | 14 | 14 |
| 20 | 20 | 20 | 20 |
| 14 | 13 | 13 | 14 |
| 20 | 19 | 19 | 20 |
| 14 | 13 | 13 | 14 |
| 20 | 19 | 19 | 20 |
| 14 | 14 | 14 | 14 |
| 20 | 20 | 20 | 20 |



| - OPENING DIMENSIONS - |           |            |             |            |             |
|------------------------|-----------|------------|-------------|------------|-------------|
| LIGHTS WIDE            | S=12"     | T=14"      | LIGHTS HIGH | S=18"      | T=20"       |
| 2                      | 2'-15/8"  | 2'-5 5/8"  | 2           | 3'-15/8"   | 3'-5 5/8"   |
| 3                      | 3'-2"     | 3'-8"      | 3           | 4'-8"      | 5'-2"       |
| 4                      | 4'-2 3/8" | 4'-10 3/8" | 4           | 6'-2 3/8"  | 6'-10 3/8"  |
| 5                      | 5'-2 3/4" | 6'-0 3/4"  | 5           | 7'-8 3/4"  | 8'-6 3/4"   |
|                        |           |            | 6           | 9'-3 1/8"  | 10'-3 1/8"  |
|                        |           |            | 7           | 10'-9 1/2" | 11'-11 1/2" |

GLASS IN OUTSIDE LIGHTS OF VENTS TO BE 1" LESS THAN THE SPECIFIED SIZE.

S=12" x 18" GLASS } STANDARD SIZE  
T=14" x 20" GLASS }

■ INDICATES UNIT WITH VENT TWO LIGHTS UP FROM BOTTOM.

TYPICAL SECTION AT FRAME

ALL TYPES SHOWN ARE PUNCHED FOR MULLIONS. TO OBTAIN WIDTH OF OPENING ADD 2" FOR EACH MULLION.

**THORN**  
STEEL WINDOWS

STANDARD TYPES AND SIZES.  
**COMMERCIAL PROJECTED WINDOWS**  
J.S. THORN CO.  
PHILADELPHIA, PA.

**C.P.-2**

11-27





22140



24141



34162



54162



25141



35163



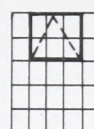
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352603



45142



55163



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552603



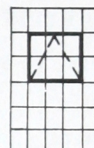
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46143



462414



56163



37161



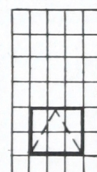
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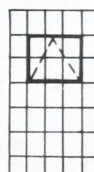
3723604



472414



57161



57164



5723604

FOR OPENING DIMENSIONS AND STANDARD DATA  
SEE SHEET C.P.-2

**THORN**  
STEEL WINDOWS

NEAR STANDARD TYPES AND SIZES  
**COMMERCIAL PROJECTED WINDOWS**  
J.S. THORN CO. PHILADELPHIA, PA.

**C.P.-3**

11-27



## HARDWARE

COM. PROJ.—ARCHITECTURAL PROJ.

7-CP-1 PLAIN CAM LATCH (*iron or bronze*) for open out commercial proj. vents.

6-MD-87 RING TYPE SCROLL CAM LATCH (*bronze only*) for open out Architectural proj. vents out of reach.

6-MD-85 SCROLL CAM LATCH (*bronze only*) for open out Architectural proj. vents within reach.

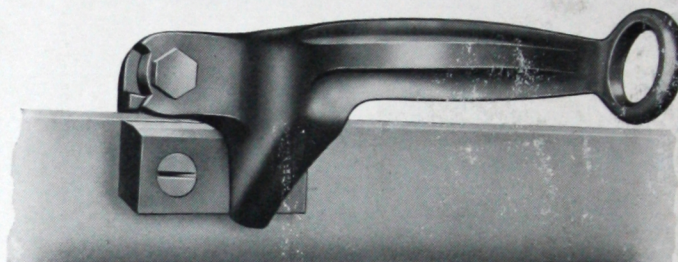
7-CP-23 SPRING CATCH AND KEEPER (*iron or bronze*) for open in commercial proj. vents.

6-CP-3 POLE RING (*iron or bronze*) applied to top of all open out vents, out of reach.

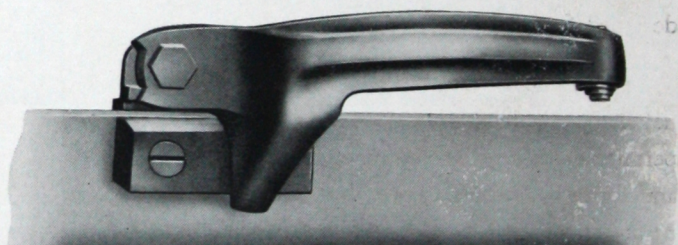
6-MD-46 SCROLL LATCH AND KEEPER (*bronze only*) for open in Architectural proj. vents



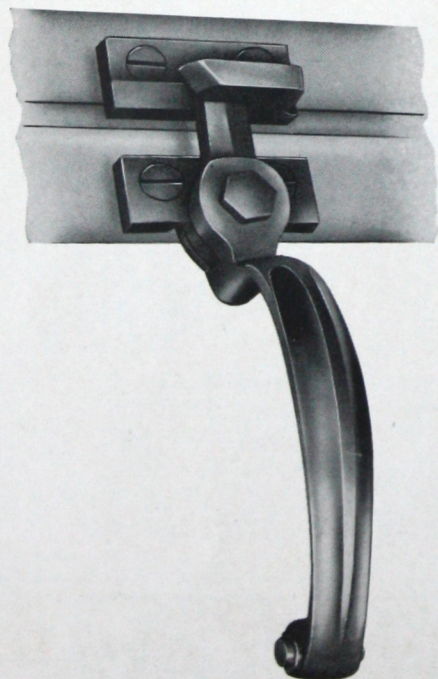
7-CP-1 PLAIN CAM LATCH



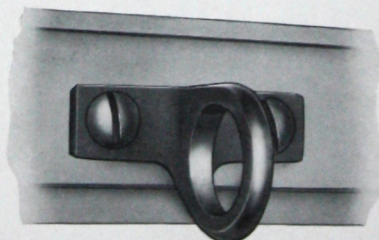
6-MD-87 RING TYPE SCROLL CAM LATCH



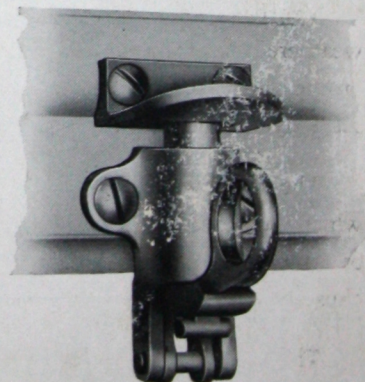
6-MD-85 SCROLL CAM LATCH



6-MD-46  
SCROLL LATCH  
and KEEPER



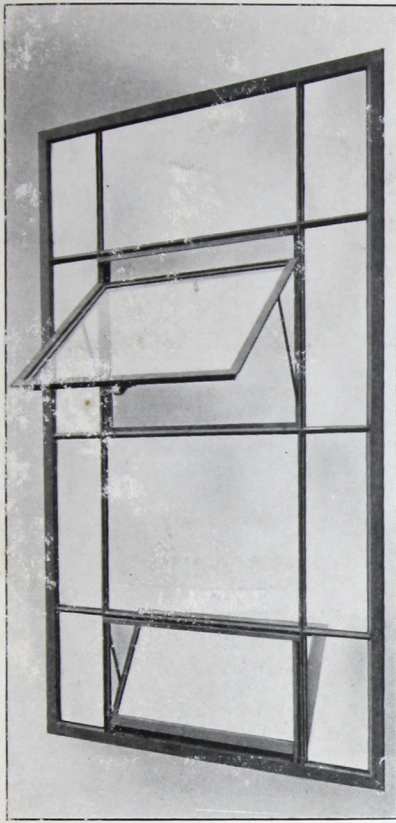
6-CP-3 POLE RING



7-CP-23  
SPRING CATCH  
and KEEPER



## THORN ARCHITECTURAL PROJECTED WINDOWS

*Specifications*

All windows unless otherwise noted shall be Thorn Architectural Projected as manufactured by J. S. Thorn Co., Philadelphia, Pa.

They shall be made of *new billet* steel one piece sections approximately  $1\frac{3}{8}$  inches deep, having a cove face moulding. The frame shall be an unequal channel section, the outside and inside legs of which shall be  $1\frac{5}{8}$  inches and  $\frac{7}{8}$  inch respectively.

All through muntin bars must be joined at intersections by neat, flush mitre joints electrically welded at four places along the mitre lines on the inside. Corners of ventilators and window frame shall also be welded.

Ventilators shall be projected type, balanced on substantial steel arms and equipped with bronze friction shoes and spring adjusters.

Solid bronze hardware shall be furnished consisting of cam latch and strike for all vents within reach and ring cam latch and pole ring for all open out vents, out of reach.

Windows shall be joined together with T bar mullions and pressed steel mullion covers.

Angle glass stops for holding glass shall be carefully mitred and fitted to all windows at the factory. (*If putty glazing is desired, specify wire glazing clips and putty inside or outside.*)

All windows and mullions shall be given a priming coat of grey metallic paint before shipment.

The Thorn Architectural Projected Windows are designed for office buildings and schools.

The frame, of *new billet* steel, is a heavy unequal channel shape, riveted and welded at the corners. This section permits a good wall anchorage, a neat plaster finish inside and forms a flat surface to which shade bracket clips may be attached.

The clips provide an extension for the attachment of standard shade brackets, so that window shades will clear the ventilator hardware.

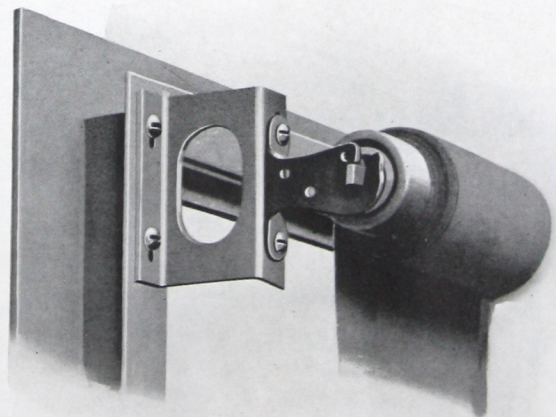
Ventilators are welded at the corners and are double weathered on all sides. The ventilator fittings are of solid bronze, light statuary finish, substantial in material and attractive in design.

The windows may be provided with angle glass stops which are carefully fitted to each light at the factory or arranged for glazing either inside or outside with wire clips and putty.

There are a large variety of standard types and sizes as shown on plate AP-2, page 23, and wide openings

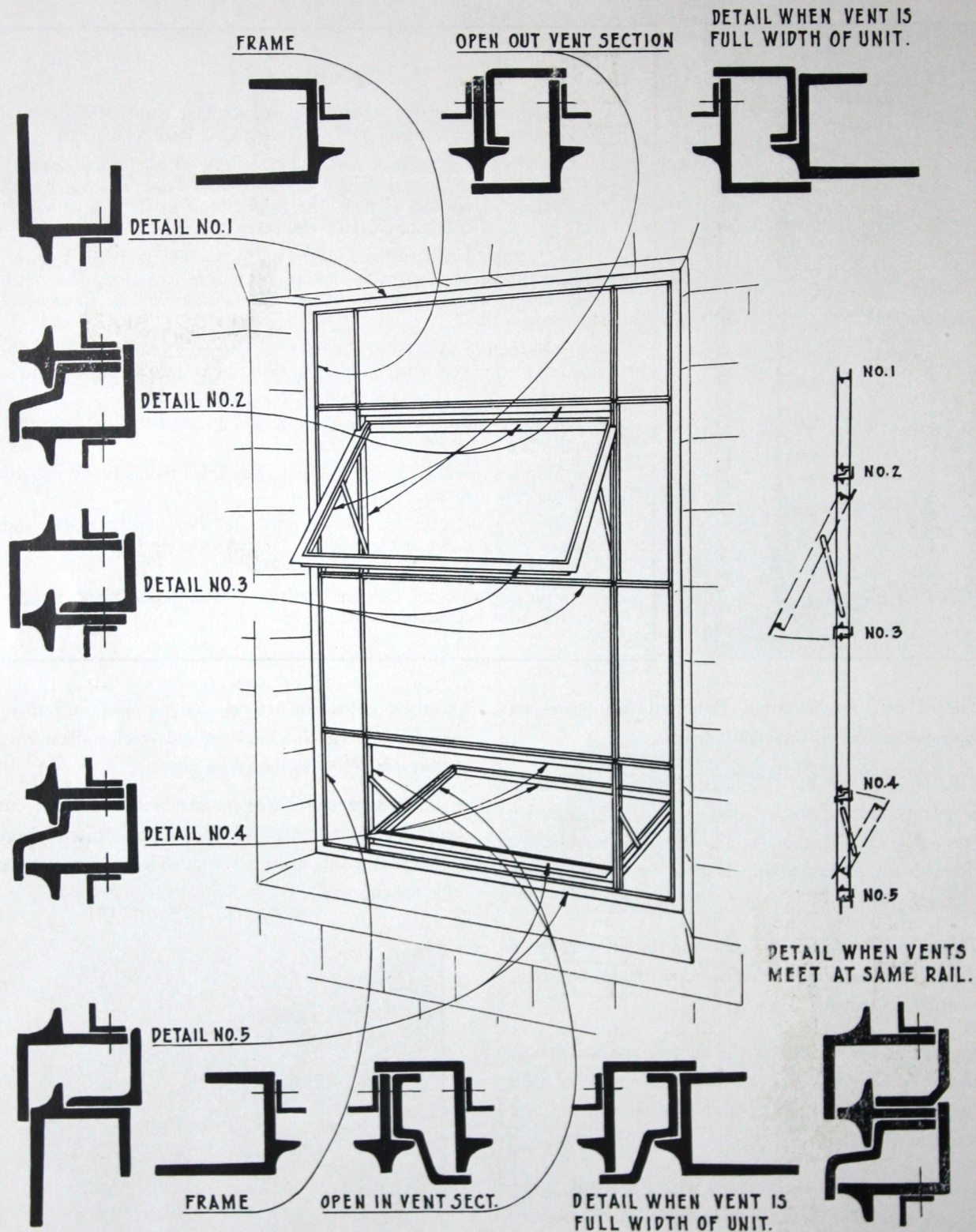
may be accommodated by joining units together with standard T mullions and pressed steel mullion covers of attractive design as shown on page 26.

All large ventilators in standard units open out and small ventilators open in. They may be tilted beyond the horizontal plane, making the outside glass surface accessible for cleaning.



THORN SHADE BRACKET CLIP





**THORN**  
STEEL WINDOWS

CONSTRUCTION DETAILS  
**ARCHITECTURAL PROJECTED WINDOWS**  
J.S. THORN CO.  
PHILADELPHIA, PA.

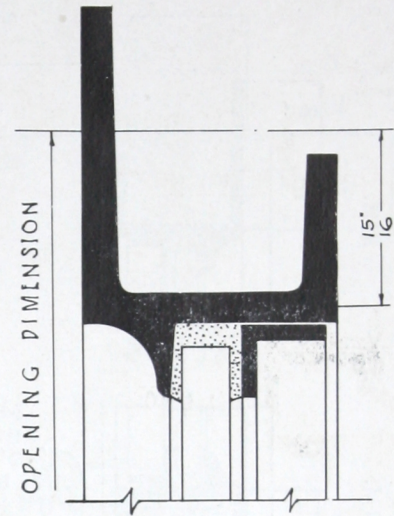
**A.P.-1**

SCALE: 6"=1'-0"

11-27.



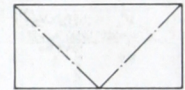
|            | 3'-0"   | 3'-6"   | 4'-0"   | 4'-6"   | 5'-0"   |             |
|------------|---------|---------|---------|---------|---------|-------------|
|            | 30 1/2" | 36 1/2" | 42 1/2" | 48 1/2" | 54 1/2" | FIXED GLASS |
| 4'-6"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 13"         |
|            | 3046    | 3646    | 4046    | 4646    | 5046    | 24"         |
| 5'-0"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 14"         |
|            | 3050    | 3650    | 4050    | 4650    | 5050    | 13"         |
| 5'-6"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 30"         |
|            | 3056    | 3656    | 4056    | 4656    | 5056    | 14"         |
| 6'-0"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 16"         |
|            | 3060    | 3660    | 4060    | 4660    | 5060    | 30"         |
| 6'-6"      | 22 1/2" | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 17"         |
|            | 3066    | 3666    | 4066    | 4666    | 5066    | 19"         |
| 7'-0"      | 22 1/2" | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 30"         |
|            | 3070    | 3670    | 4070    | 4670    | 5070    | 20"         |
| 7'-6"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 12 1/2"     |
|            | 3076    | 3676    | 4076    | 4676    | 5076    | 24"         |
| 8'-0"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 24"         |
|            | 3080    | 3680    | 4080    | 4680    | 5080    | 14"         |
| 8'-6"      | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 52 1/2" | 15 1/2"     |
|            | 3086    | 3686    | 4086    | 4686    | 5086    | 30"         |
| 9'-0"      | 22 1/2" | 28 1/2" | 34 1/2" | 40 1/2" | 46 1/2" | 30"         |
|            | 3090    | 3690    | 4090    | 4690    | 5090    | 20"         |
| VENT GLASS | 31 1/2" | 37 1/2" | 43 1/2" | 49 1/2" | 55 1/2" | 15 1/2"     |
|            |         |         |         |         |         | 24"         |
|            |         |         |         |         |         | 24"         |
|            |         |         |         |         |         | 17"         |



# SYMBOLS



DOWN & OUT



UP & IN

STANDARD WINDOW UNITS MAY BE COMBINED BY THE ADDITION OF VERTICAL MULLIONS. ADD 2" TO OPENING WIDTH FOR EACH MULLION USED.

WINDOWS CAN BE FURNISHED WITH GLAZING ANGLES FOR INSIDE GLAZING OR CAN BE FURNISHED FOR PUTTY GLAZING INSIDE OR OUTSIDE.

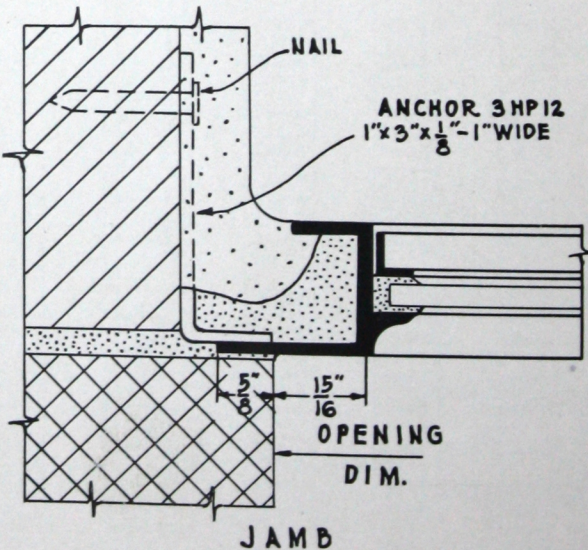
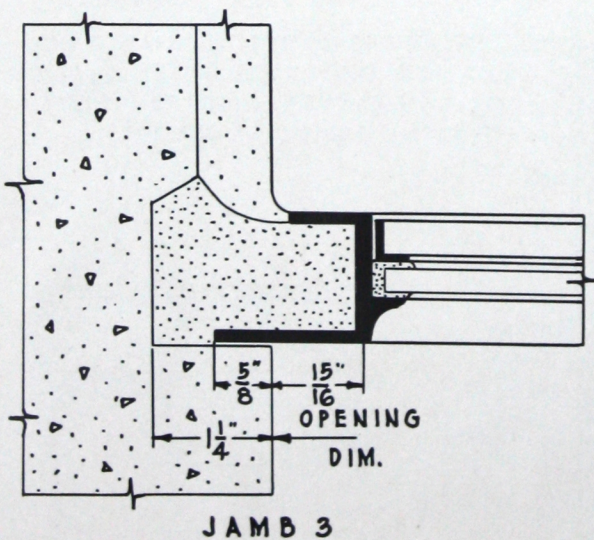
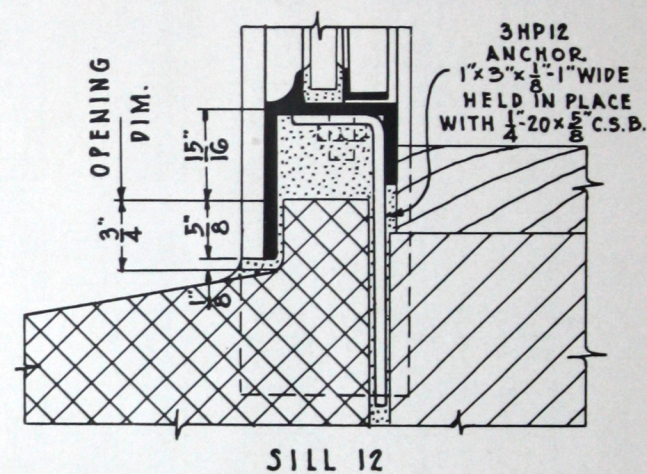
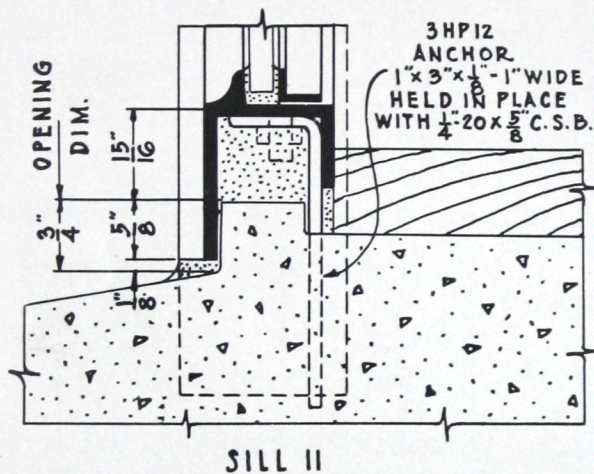
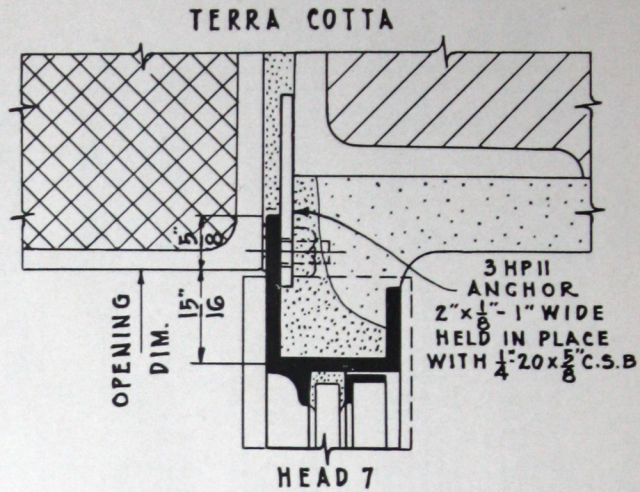
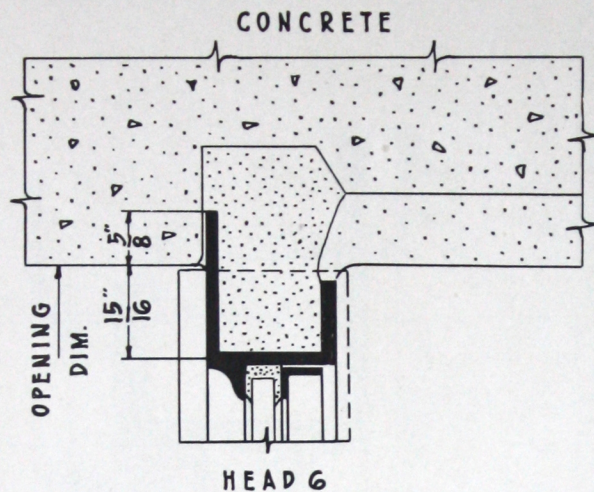
**THORN**  
STEEL WINDOWS

STANDARD TYPES AND SIZES  
**ARCHITECTURAL PROJECTED WINDOWS**  
J.S. THORN CO. PHILADELPHIA, PA.

A.P.-2

7-36





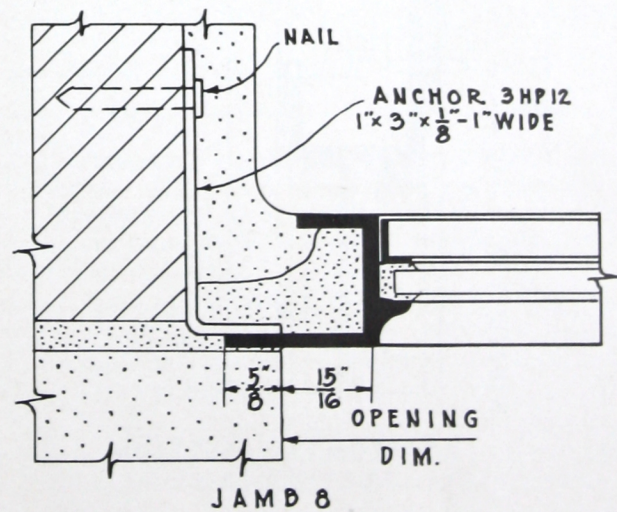
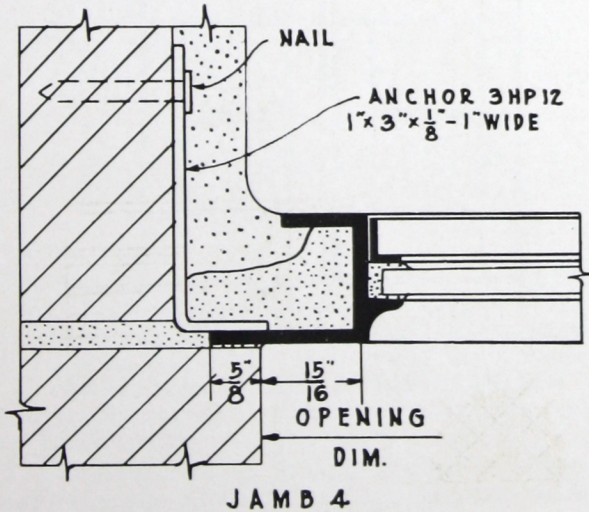
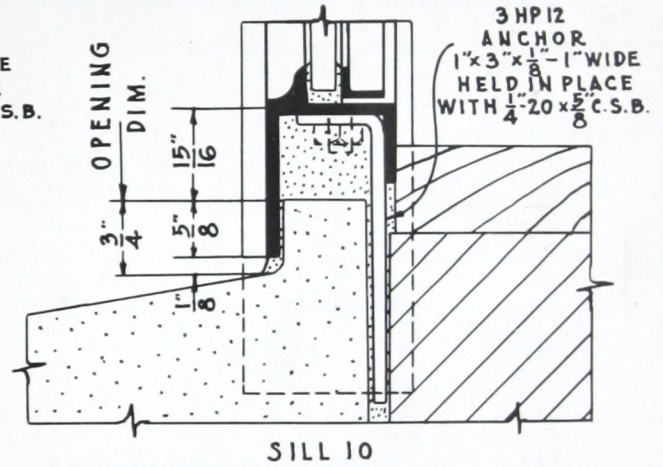
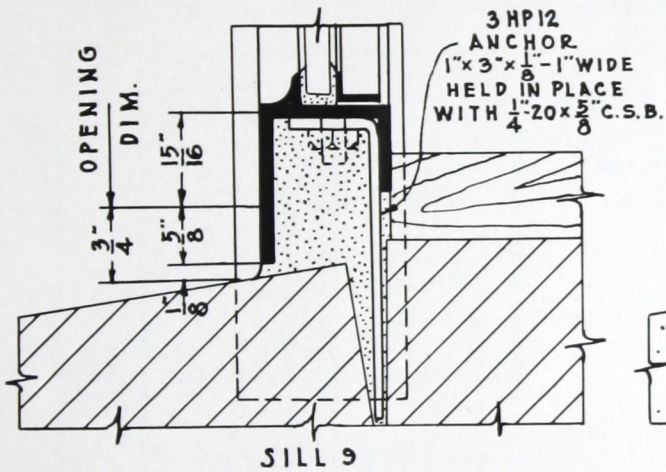
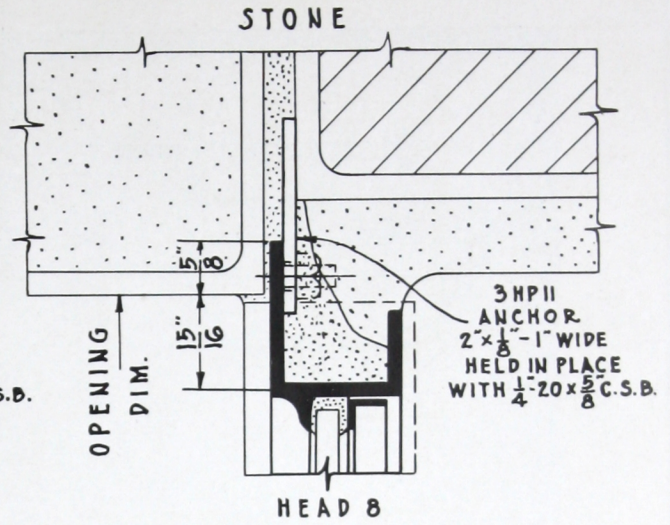
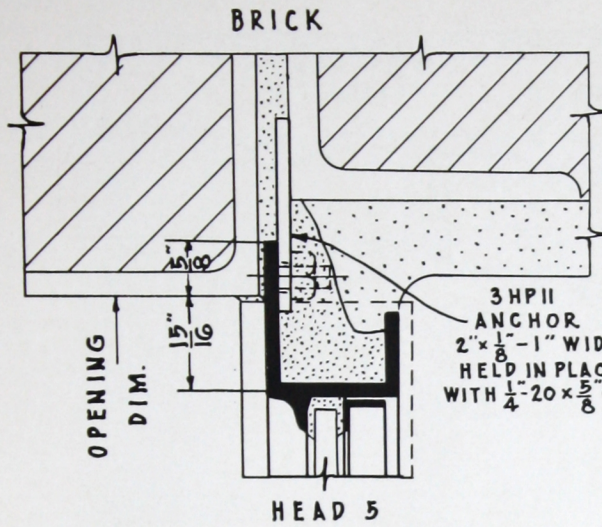
THORN | STANDARD INSTALLATION DETAILS  
STEEL WINDOWS | ARCHITECTURAL PROJECTED WINDOW  
J.S. THORN CO. | PHILADELPHIA, PA.

A.P.-3

SCALE: 6"=1'-0"

11-27.





**THORN**  
STEEL WINDOWS

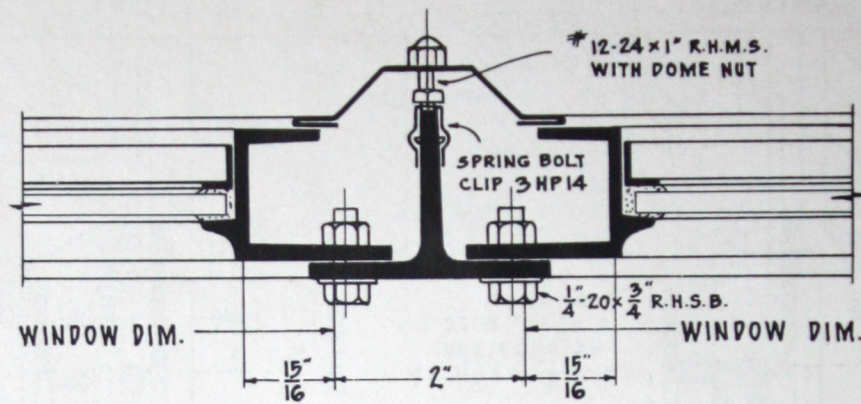
STANDARD INSTALLATION DETAILS  
**ARCHITECTURAL PROJECTED WINDOW**  
J.S. THORN CO.  
PHILADELPHIA, PA.

**A.P.-4**

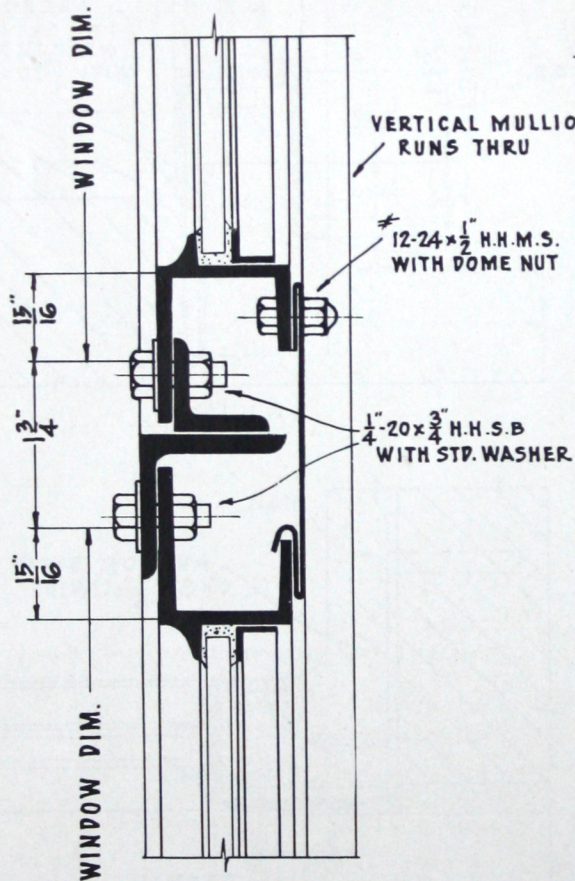
SCALE: 6" = 1'-0"

11-27

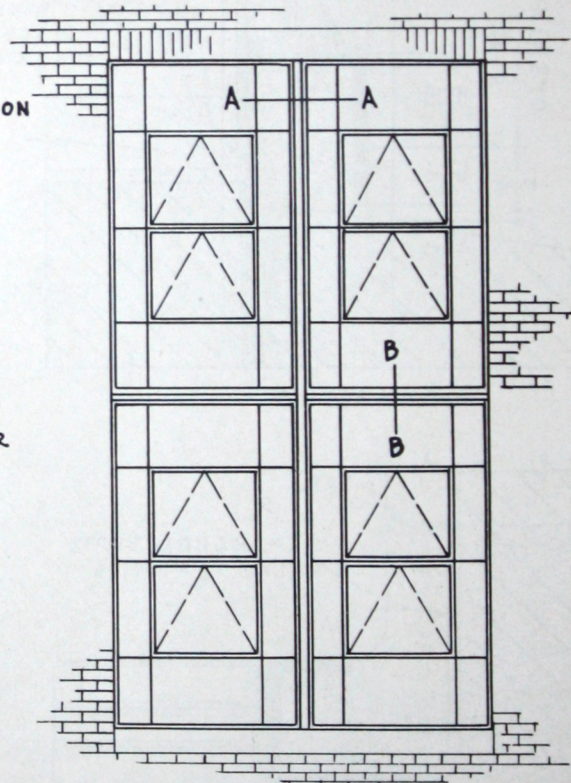




VERTICAL MULLION  
SECTION "A-A"



HORIZONTAL MULLION  
SECTION "B-B"



TYPICAL ELEVATION OF MULLIONS

**THORN**  
STEEL WINDOWS

HORIZONTAL AND VERTICAL MULLION DETAILS  
**ARCHITECTURAL PROJECTED WINDOWS**  
J.S. THORN CO.

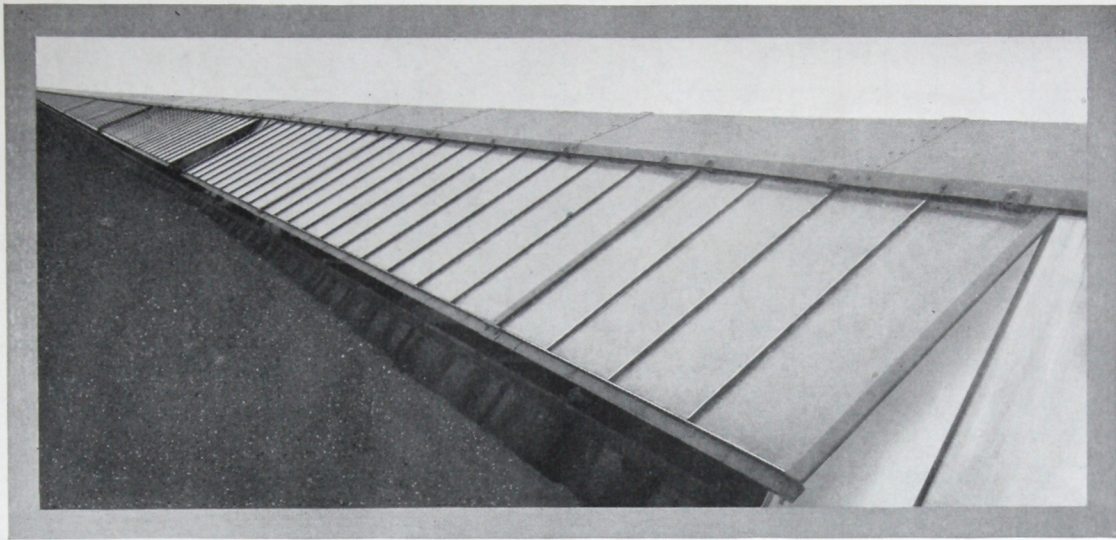
PHILADELPHIA, PA.

**A.P.-5**  
SCALE: 6"-1"=1'-0"

11-27.



## THORN CONTINUOUS WINDOWS



### Specifications

All continuous windows as shown on drawings shall be Thorn Standard Type as manufactured by J. S. Thorn Co., Philadelphia, Pa.

The members of the window units shall be of one piece rolled steel sections not less than  $\frac{3}{16}$  inch thick, solidly welded together.

The window units shall be joined together by heavy splice plates along both top and bottom rails, forming strong weathertight joints.

Windows shall be hung from suitable steel angles which shall be furnished and erected by the steel contractor, who shall be held responsible for their straightness. The hinges shall be of malleable iron with steel pins and shall be spaced approximately 4' 0" apart.

All windows shall be given a good coat of grey metallic paint at the factory.

Glass and glazing shall be furnished under another heading in accordance with window manufacturer's recommendations and details, but the window manufacturer shall furnish a sufficient quantity of angle glazing clips with the windows.

All necessary flashings at head, sill and jambs of openings, also at any gaps between runs shall be furnished by sheet metal contractor under another heading.

NOTE:—Storm panels at ends of all operated runs are furnished only when specified.

Thorn Continuous Windows are for use in roof construction and properly incorporated in roof design they will perfectly daylight and ventilate buildings of great widths and lengths.

This type of window, controlled in long lines by the powerful Thorn Tension Operator, is particularly effective in quickly carrying off smoke, gases, fumes and impure air, forming a great glass awning as it opens. This unbroken line of steel and glass permits ventilation regardless of weather conditions, when equipped with stationary storm panels which are furnished at a slight extra cost.

The thrust rods of the operator attach to the bottom rail and the rods are adjusted to pull this section to the sill of the opening. The great flange width of this section prevents any possibility of sag between operator thrust rods which are seldom spaced less than eight feet apart in any type of operator.

The windows are hung on heavy malleable iron hinges which allow operation without friction.

Whenever possible continuous windows should be erected only by experienced men. We maintain a field organization to do this work and if the erection is a part of our contract, we assume full responsibility for a satisfactory installation.

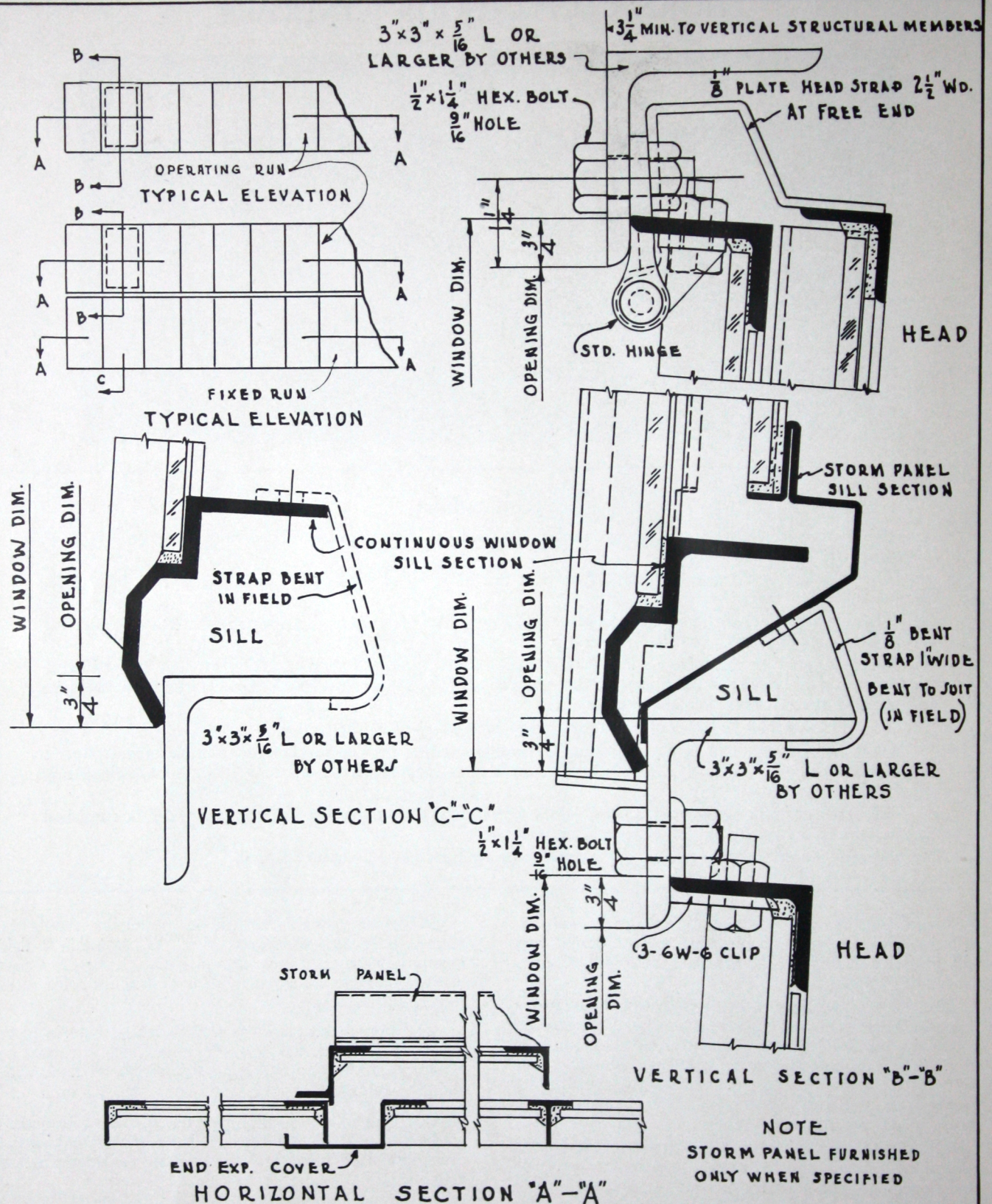
The glass is set from the outside and is held in place by a sufficient quantity of short angle clips. It should be carefully bed puttied and the putty struck off flush with the glass surface.

A priming coat of good grey metallic paint is applied at the factory to all windows and parts and two additional coats should be applied by the painting contractor in the field.

Structural steel to which the windows are hung and vertical supports for operating device should be furnished by the contractor for structural steel. Upright supports should be provided eight to ten feet on centers. The head girt angle should be at least 3" x 3" x  $\frac{1}{4}$ ".



THORN CONTINUOUS WINDOWS



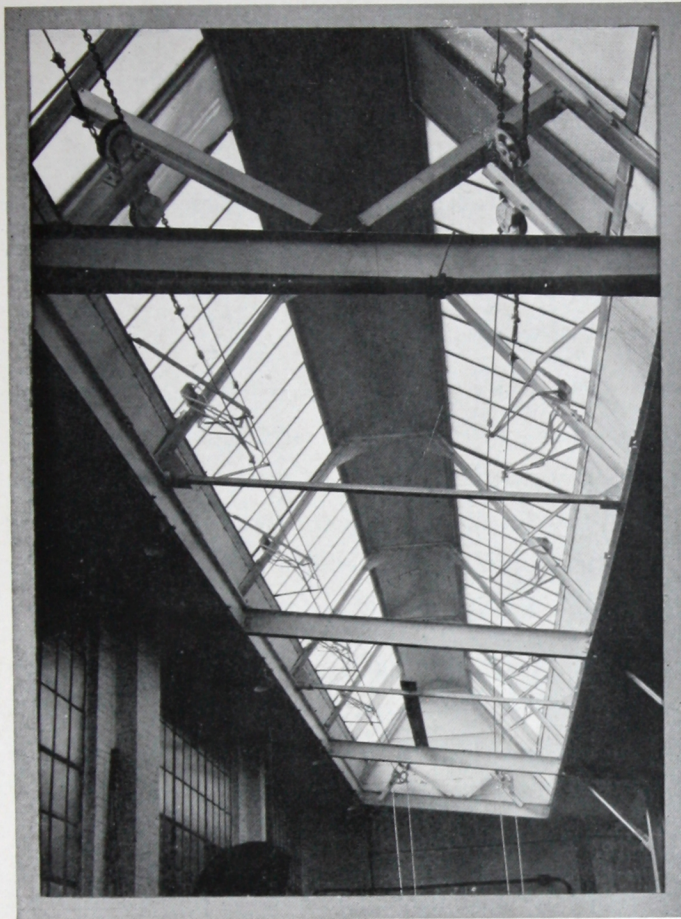
**THORN**  
STEEL WINDOWS

TYPICAL DETAIL SINGLE & DOUBLE LINE OPERATED & FIXED  
**CONTINUOUS WINDOWS**  
J.S. THORN CO. PHILADELPHIA, PA.

**C.W.-4**  
SCALE 6"-1'-0" 9-33



## THORN TENSION OPERATORS



Thorn Tension Operator provides a window control for long and heavy lines of windows. It is designed for heavy duty and is generally used in conjunction with Thorn Continuous windows. It is also adapted to hinged corrugated wire glass construction, and has been successfully used in many installations of this type.

It is a smooth working mechanism, free from friction and one in which practically the entire load is carried by compound lever arms designed and built for heavy duty and the only stress to which the transmission line is subjected is to pull the arms.

This mechanism has been in practical use over eighteen years and the results have been so satisfactory that only a very few minor changes have been necessary since the original design.

### Specifications

All window operators except as otherwise noted shall be Thorn Tension Type as manufactured by J. S. Thorn, Philadelphia, Pa.

The transmission line shall be composed of solid  $\frac{1}{2}$ -inch round steel rods headed at the ends and coupled together. Turn-buckles shall be placed in the line at both ends to provide adjustment.

Compound lever arms of substantial construction shall absorb the window load and all strain on the transmission line must be eliminated.

The operating power shall consist of a machine cut steel worm and gear and sprocket run in heavy oil and enclosed in a dust proof case. The power shall have an exposed chain wheel fitted with chain guard from which shall hang a hand chain to within reaching distance from floor.

All operator parts shall receive priming coat of paint at the factory before shipment.

This operator shall be erected and adjusted in strict accordance with manufacturer's details and recommendations.

This device is composed of two lines of tension rods made of  $\frac{1}{2}$ -inch round steel in lengths of about 20 feet, headed at the ends and coupled together. These two lines of rods are connected at the extreme ends of the runs by a sprocket chain on the power end and a heavy link chain on the pulley end. Turn-buckles at both ends of the tension line allow for adjustment.

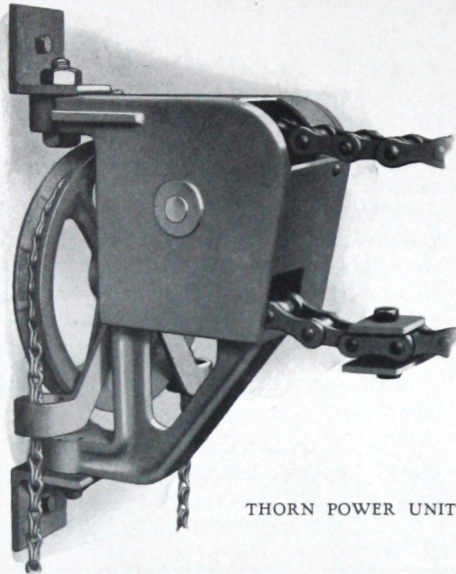
At intervals of about ten feet along the transmission line a pair of compound lever arms are connected to the tension rods. These arms attach to and pivot on stationary steel brackets at one end, connected to the steel uprights, the other end attaches to the window thrust rod. The arms connect alternately to the upper and lower tension rods and therefore move in opposite directions, neutralizing the oblique thrust to the window. The leverage increases as the load becomes greater, therefore, the effort to operate



## THORN TENSION OPERATORS

does not increase in proportion to the increase of the load being lifted.

The arms absorb the entire window load and eliminate any strain on the tension line. They are so designed that the arc described by the arm movement is very small and therefore the "in" and "out" movement of the line is reduced to a minimum. All hinged arm connections are bronze bushed throughout. Standard arms are made in two sizes—20" and 25".



THORN POWER UNIT

The 20" arm is for 3' and 4' high windows and will open the window approximately 30°.

The 25" arm is for 5' and 6' windows and will give an opening of approximately 40°.

The operating power for manual operation consists of a machine cut worm and sprocket gear enclosed in a dust proof case and run in oil. The worm will hold the sash at any angle. A safety stop is applied to the chain which runs over the power sprocket, preventing the device from operating beyond a safe limit, due to continued operating of the hand chain.

Motors may be applied to operate Thorn Tension operator if desired. They should be specified for all extremely long runs (over 150 feet) and in all cases where quick opening and closing of the windows is necessary.

All operator parts are painted at the factory with a priming coat and should receive a coat in the field.

We furnish all necessary operator parts for the complete line, including necessary steel supports for powers and return idlers, but do not furnish steel supports for the arms. The arms require uprights from eight to ten feet apart and we will furnish details of these arm supports if needed. If uprights are spaced at greater distances than ten feet care should be taken to see that the end support is placed not greater than ten feet or less than eight feet from the end of the opening to prevent excessive window overhand and whipping.

When motor operation is desired we include as standard equipment fully enclosed ball-bearing motors of proper size, necessary sprockets, chain, magnetic reversing switches, limit switches, individual push button stations and wiring diagram. Other electrical equipment and wiring must be included in the electrical contract.

The standard equipment which we furnish is for 220 or 440 volts, 3 phase, 60 cycle, alternating current. If power is other than this it is necessary to specify it in detail and special prices will be quoted.

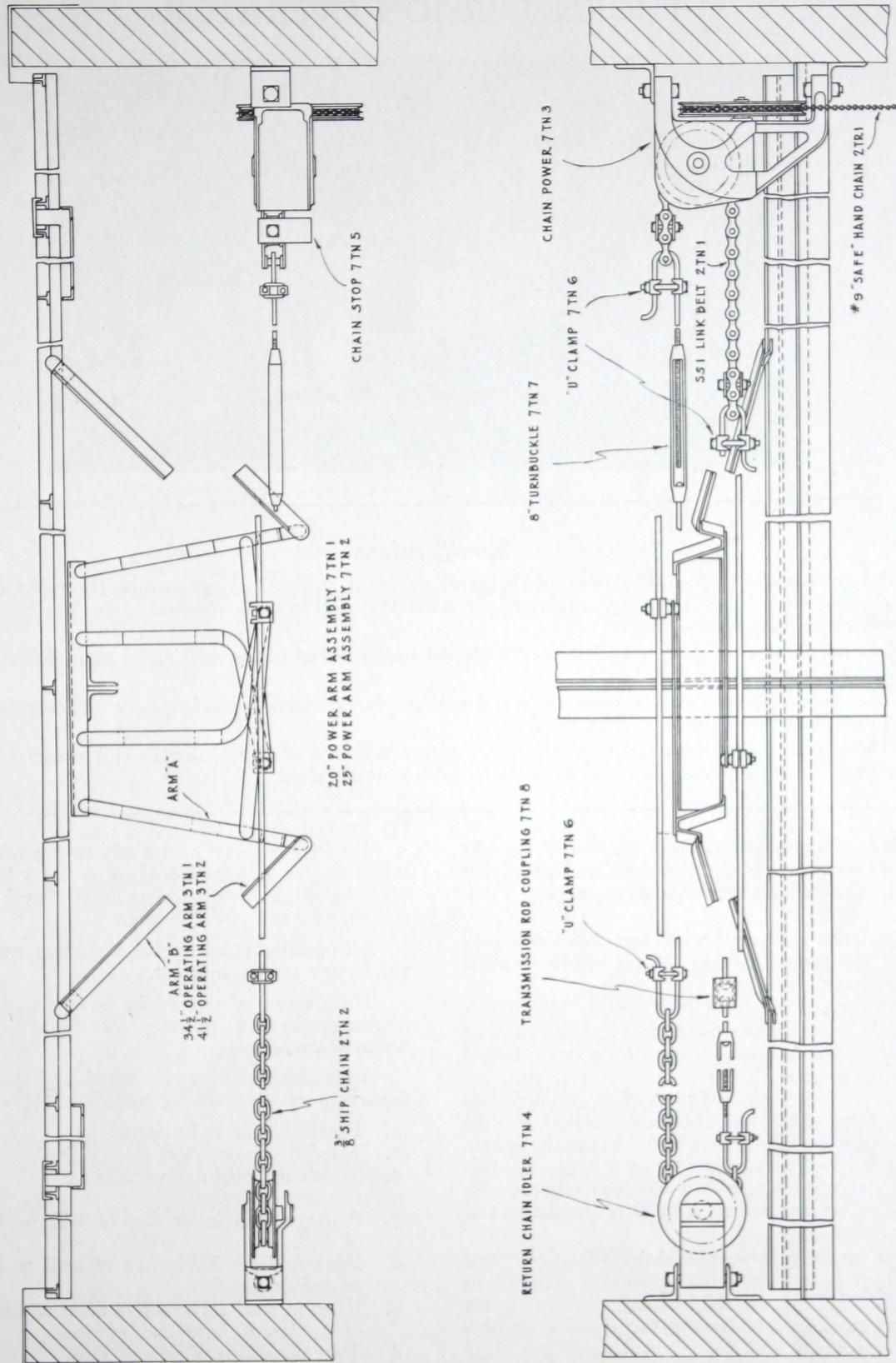
Tension operating device should only be erected by experienced mechanics, particularly motor controlled operators.

It is customary to include under the erection contract for motor operator, the mounting of the motors, sprockets, chains and limit switches; and under the electrical contract the installation of magnetic reversing switches, push button station and furnishing and installing safety type line switches, wire, conduit and other miscellaneous fittings.

In order to prevent any errors in furnishing operating device, we should receive a complete set of drawings showing floor plans, elevations, cross sections and structural steel details. These drawings should show the following:

1. The size and length of the windows to be operated.
2. The size and details of columns, pilasters, braces or other obstructions.
3. Clearances required for crane.
4. Locations from which windows will be operated.





**THORN**  
STEEL WINDOWS

GENERAL ARRANGEMENT - CHAIN POWER, CHAIN IDLER AND ARMS.  
**TENSION OPERATOR**  
J.S. THORN CO.  
PHILADELPHIA, PA.

**TN.-1**

SCALE: 3"=1'-0"

11-27



## THORN TORSION OPERATOR



### Specifications

All operators for pivoted windows or skylights where shown on the drawings shall be Thorn Torsion type. The shafting shall be of steel pipe supported by adjustable steel brackets attached to the window mullions or steel work wherever possible.

The operating arms shall be made of heavy pressed steel attached to the shafting by means of heavy "U" bolt clamps, guaranteed not to slip.

The operating power shall be a cast worm and segment gear operated by hand chain or vertical pipe (*specify which*) extending to within reach from the floor.

The operators shall be erected strictly in accordance with manufacturer's details and recommendations. All parts shall receive priming coat of paint at the factory before shipment.

The Thorn Torsion operator is a window or skylight control for short runs of ventilators and we recommend that line lengths do not exceed the limits given on plate TR-2, Page 34.

Our experience with mechanical operators dates back to 1879 and our present devices are the results of these years of experience.

This operator is a revolving shaft device. The shaft is of 1 inch or  $\frac{1}{2}$  inch pipe as required to which are attached pressed steel arms which have a connecting link attached to the ventilators.

The Thorn arm is made of a piece of 12 ga. steel plate pressed into shape and is decidedly more practical than the old type of cast iron arm which is brittle and easily broken. This arm is attached to the shafting by a large "U" bolt which tightly clamps the pipe shaft and positively prevents any slipping. The arms are made in three lengths to suit varying conditions.

The pipe shafting is supported by adjustable steel brackets which have a cast iron extension designed to give a surface bearing on the shafting preventing the bracket from cutting and allowing the shafting to turn freely and without friction.

Operating Powers can be either chain operated or pipe operated. They consist of a cast iron worm and segment gear on a steel shaft and mounted on adjustable steel brackets. A chain wheel is attached to the shaft in the chain power by a set screw.

The Pipe operated device may be controlled by a hand wheel in the horizontal position or by a bevel gear and crank handle in the vertical position. Bevel gears are cast and enclosed in a cast iron case.

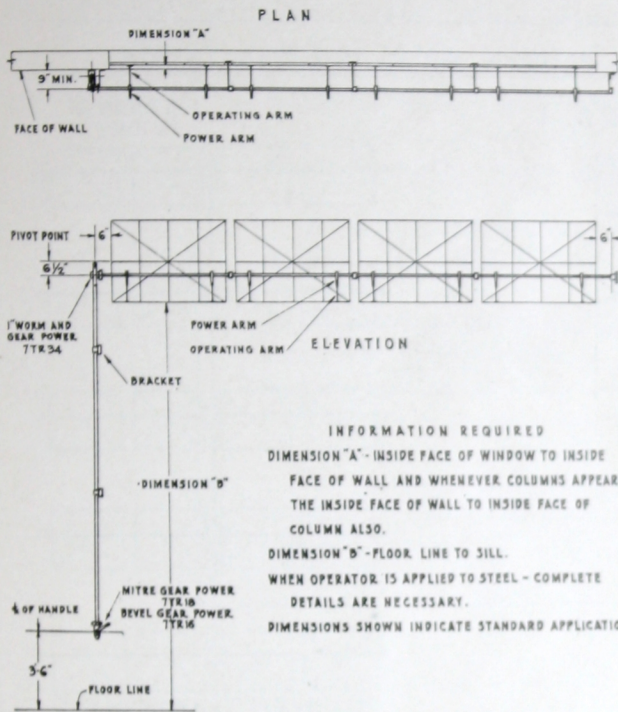
All operator parts receive a priming coat of paint at the factory before shipment.

The erection of this device is simple and experienced mechanics are not necessary for short runs and under ordinary conditions.

A complete drawing or a sketch and the following information are necessary for manufacturing:

1. Length of line to be operated.
2. Number of ventilators in each line.
3. Width and height of ventilators.
4. Location of pivots.
5. Distance from inside face of window to inside face of wall.
6. Distance from inside face of wall to inside face of column or pilaster.
7. If set in steel construction distance from inside face of window to inside face of truss.
8. Type of powers, Chain or Pipe.
9. Location of operating station.
10. If pipe power operated are bevel gears necessary.
11. If operator occurs in monitor or roof is it necessary to bring chain or pipe over to side wall.
12. Height from floor to sill of ventilators.





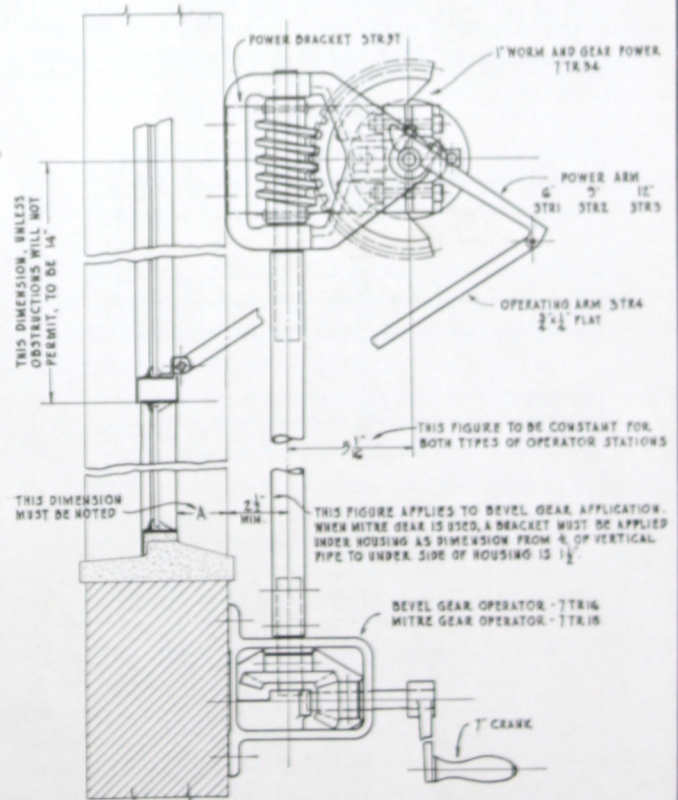
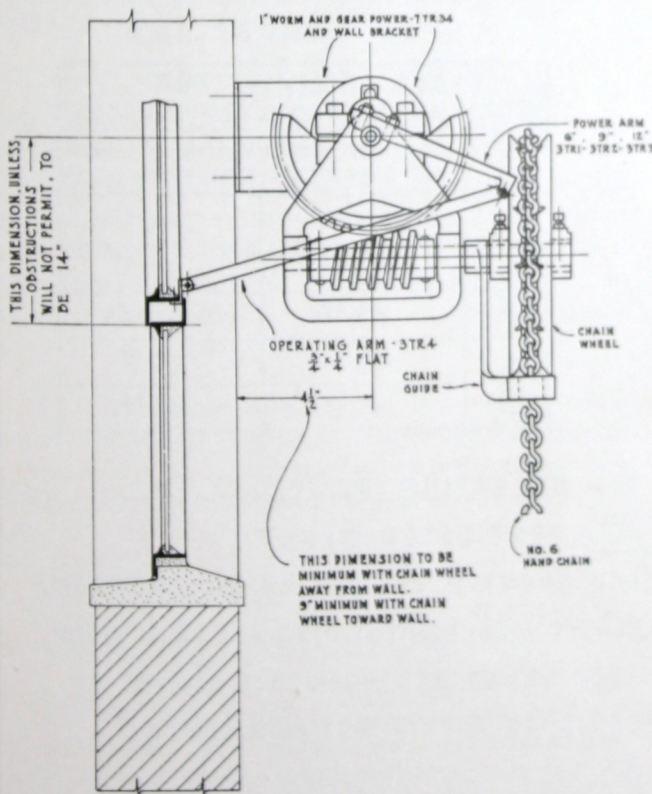
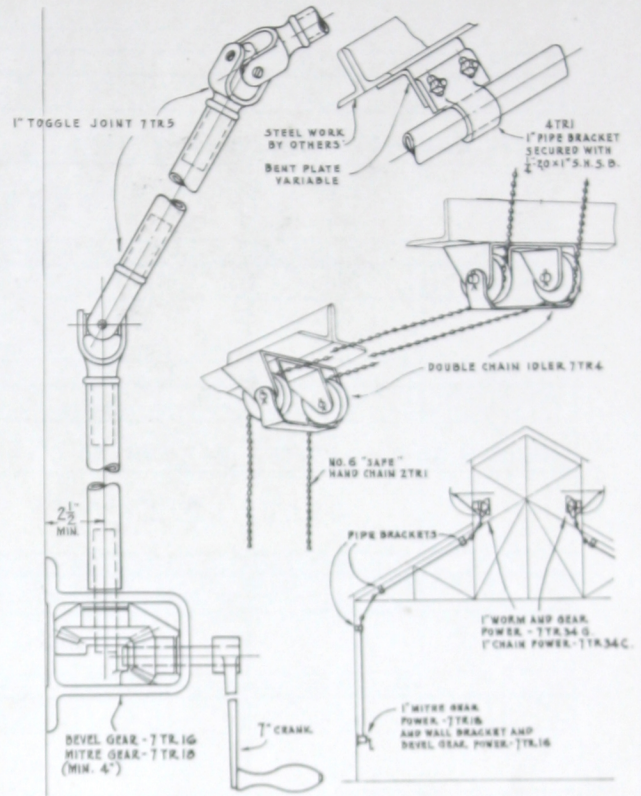
INFORMATION REQUIRED

DIMENSION "A" - INSIDE FACE OF WINDOW TO INSIDE FACE OF WALL AND WHENEVER COLUMNS APPEAR THE INSIDE FACE OF WALL TO INSIDE FACE OF COLUMN ALSO.

DIMENSION "B" - FLOOR LINE TO SILL.

WHEN OPERATOR IS APPLIED TO STEEL - COMPLETE DETAILS ARE NECESSARY.

DIMENSIONS SHOWN INDICATE STANDARD APPLICATION



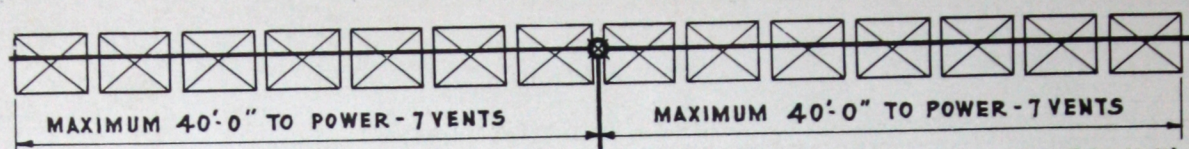
**THORN**  
OPERATORS

GENERAL DETAILS  
**TORSION OPERATOR**  
J.S. THORN CO  
PHILADELPHIA, PA.

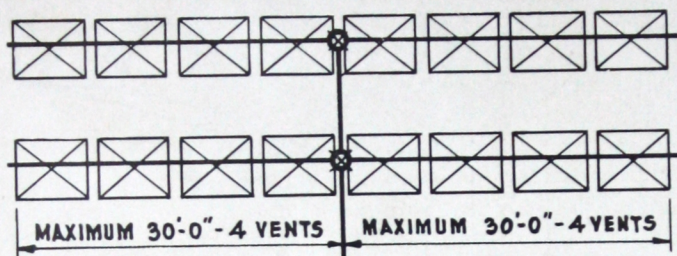
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7-36

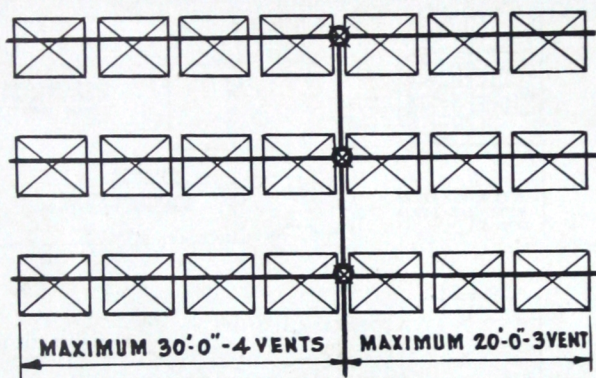




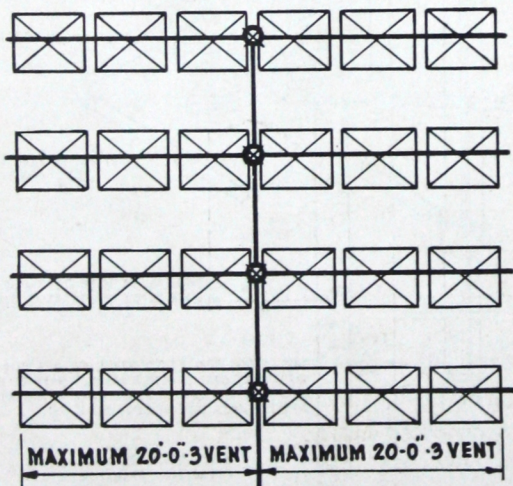
GROUP NO. 1



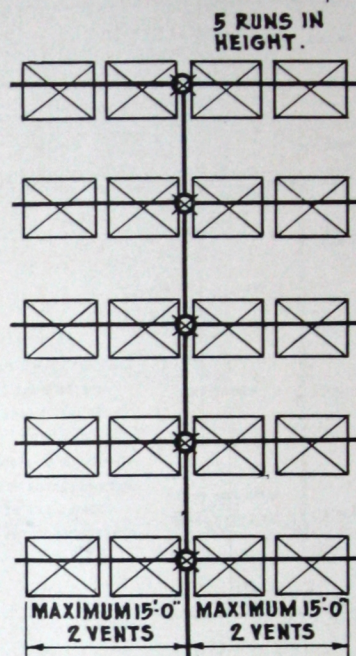
GROUP NO. 2



GROUP NO. 3



GROUP NO. 4



GROUP NO. 5

| TABLE OF LIMITS FOR HORIZONTALLY PIVOTED WINDOWS |                              |                                    |
|--|------------------------------|------------------------------------|
| GROUP NO.  | MAXIMUM LENGTH OF POWER LINE | MAXIMUM DISTANCE FROM POWER TO END |
| 1  | 80 FT.                       | 40 FT.                             |
| 2  | 60 FT.                       | 30 FT.                             |
| 3  | 50 FT.                       | 30 FT.                             |
| 4  | 40 FT.                       | 20 FT.                             |
| 5  | 30 FT.                       | 15 FT.                             |

⊗ = OPERATING POWER.

⊠ = VENTILATOR UNIT.

EACH GROUP IS CONTROLLED BY HANDWHEEL LOCATED A CONVENIENT DISTANCE FROM FLOOR. OTHER GROUP ARRANGEMENTS CAN BE FURNISHED WITHIN MAXIMUM LIMITS.

**THORN**  
OPERATORS

TYPICAL GROUPING AND LIMITS  
**TORSION OPERATOR**  
J.S. THORN CO. PHILADELPHIA, PA.

**TR-2**

11-27



# THORN RACK AND PINION OPERATOR

## Specifications

All operators for pivoted and projected ventilators where called for shall be Thorn Rack and Pinion type. The shafting shall be 1" steel pipe, supported by adjustable steel brackets with cast iron bearing inserts, attached to window mullions or steel work wherever possible.

A cut steel rack and machine cast pinion gear held to the pipe shafting by set screws shall be furnished for each ventilator.

The operating power shall consist of a machine cast worm and gear mounted in an open housing and controlled by means of a hand chain or vertical pipe (*specify which*). (*If vertical pipe is required, specify whether hand wheel or crank is to be in vertical or horizontal position.*)

The device shall be erected in accordance with manufacturer's details and recommendations, and shall operate without strain or excessive friction.

Thorn' Rack and Pinion operators are designed for operating long runs of pivoted and projected ventilators. They are also recommended for short runs of heavy continuous windows.

The limits shown on detail plate TO 1, Page 36, are those recommended by the Metal Window Institute; however, due to the heavy construction of all parts we have no hesitancy in exceeding these limits by 25%. We have done this with very successful results in many cases where it was necessary to economize and where conditions made it advisable to increase the length of the run in order to place the power unit and control in a more advantageous position.

The device consists of a 1" steel pipe shaft on which are mounted machine cast pinions, the teeth of which mesh with those of a 1" x  $\frac{1}{4}$ " steel cut curved rack attached to the ventilator. A yoke consisting of two rounded steel plates 1" x  $\frac{3}{8}$ " holds the rack to the pinion, forcing the teeth in mesh.

Steel rollers are mounted in the yoke permitting the rack to run smoothly and without friction.

The power unit consists of a machine cast worm and gear mounted in a heavy cast-iron yoke, and operated by a cast-iron chain wheel and hand chain or a vertical pipe and hand wheel and crank.

In order to eliminate all friction in the vertical shaft we mount universal joints at top and bottom to overcome

possible distortion or misalignment. The vertical pipe may be turned by means of a hand wheel in the horizontal position or a combination of cast-mitre gears mounted in a housing and a hand wheel or crank in the vertical position. The latter slightly increases the cost but makes the operation more convenient and we, therefore, recommend it.

Where conditions require and when clearly specified, we furnish the worm and gear operating power unit and the mitre gear unit mounted in dust-proof oil cases.

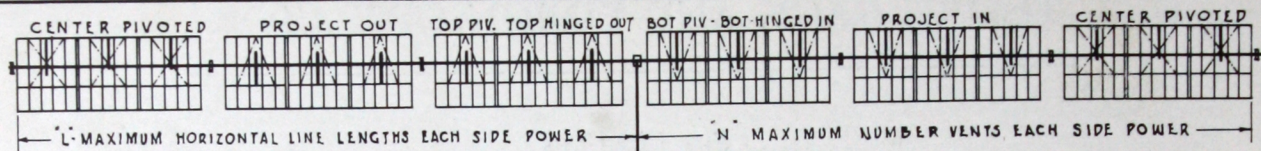
Motor controls can be applied to this operator. In such cases we include as standard equipment ball bearing motors, sprockets, chains, reversing switches, limit switches, individual push button stations and wiring diagram. Other electrical equipment and wiring should be specified under the electrical contract.

Under the erection contract for motor controlled Rack & Pinion operators should be included the mounting of the motors, sprockets, chains and limit switches and under the electrical contract the installation of magnetic reversing switches, push button stations, furnishing and installing safety type line switches, wire, conduit and miscellaneous fittings.

We should be furnished with details showing the type and sizes of the ventilators to be operated, the length of the runs, location of the powers, distance from the inside face of windows to the inside face of wall, columns or piers; height from floor to sill of ventilators and type of power control desired, i.e., vertical pipe or hand chain.



## THORN RACK AND PINION OPERATOR



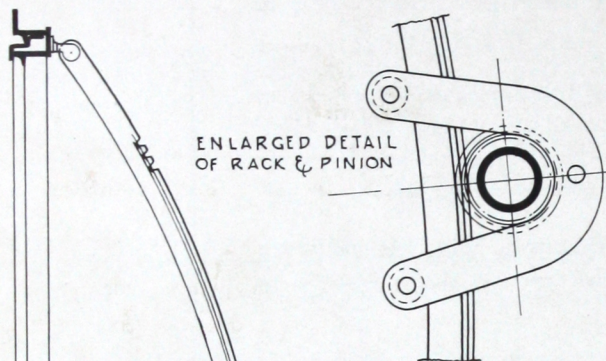
# RACK AND PINION OPERATORS

MANUALLY CONTROLLED

ELECTRICALLY CONTROLLED

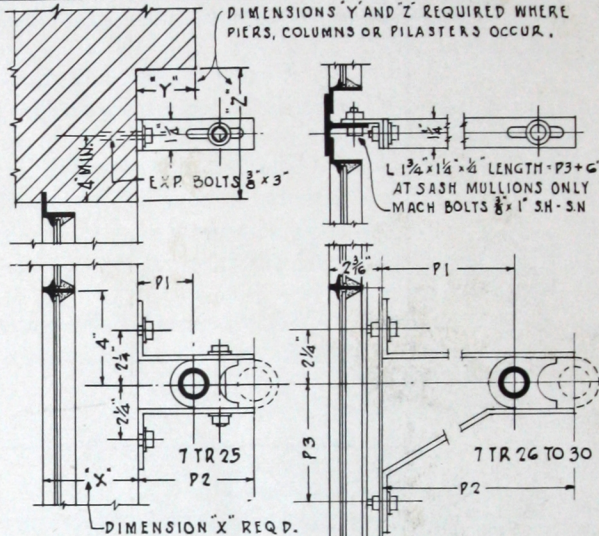
|       | CENTER<br>PIVOTED | PROJECT<br>IN | PROJECT<br>OUT | TOP<br>HINGED | BOT.<br>HINGED | TOP<br>PIVOTED | BOT.<br>PIVOTED | CENTER<br>PIVOTED | PROJECT<br>IN | PROJECT<br>OUT | TOP<br>HINGED | BOT.<br>HINGED | TOP<br>PIVOTED | BOT.<br>PIVOTED |
|-------|-------------------|---------------|----------------|---------------|----------------|----------------|-----------------|-------------------|---------------|----------------|---------------|----------------|----------------|-----------------|
| " L " | 80 FT.            | 50 FT.        | 50 FT.         | 40 FT.        | 40 FT.         | 40 FT.         | 40 FT.          | 150 FT.           | 85 FT.        | 85 FT.         | 75 FT.        | 75 FT.         | 75 FT.         | 75 FT.          |
| " N " | 12                | 10            | 10             | 8             | 8              | 8              | 8               | 30                | 17            | 17             | 15            | 15             | 15             | 15              |

(DIMENSIONS "Y" AND "Z" REQUIRED WHERE  
PIERS, COLUMNS OR PILASTERS OCCUR.



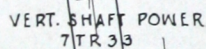
ENLARGED DETAIL  
OF RACK & PINION

RACK & PINION 7 T R 17  
31" RACK STANDARD  
SPECIFY OTHER LENGTHS.

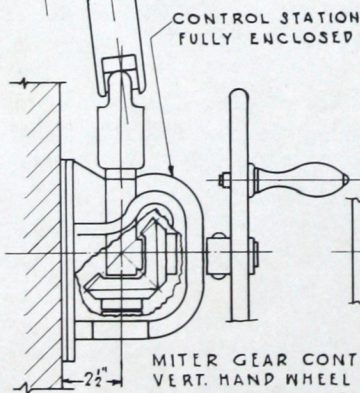


BRACKET ATTACHED TO MASONRY ATTACHED TO SASH OR STEEL WORK  
BRACKET SCHEDULE

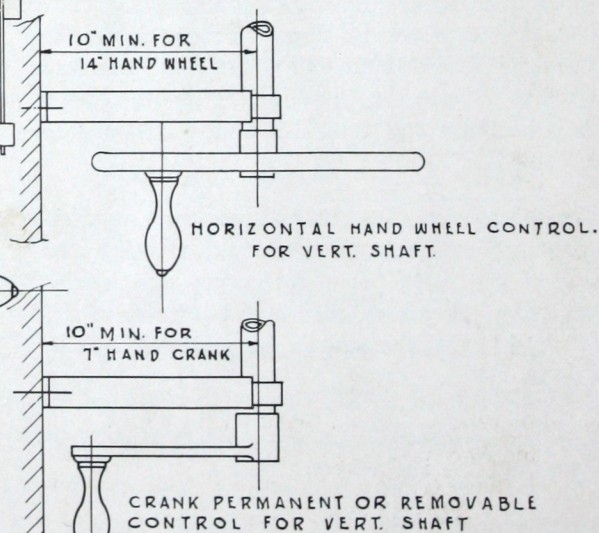
| BRACKET SCHEDULE |            |            |              |              |              |              |
|------------------|------------|------------|--------------|--------------|--------------|--------------|
| MARK             | 7TR25      | 7TR26      | 7TR27        | 7TR28        | 7TR29        | 7TR30        |
| P1               | 1" TO 3"   | 5/8" TO 7" | 9/8" TO 11"  | 13/8" TO 15" | 17/8" TO 19" | 21/8" TO 23" |
| P2               | 3/8" TO 5" | 7/8" TO 9" | 11/8" TO 13" | 15/8" TO 17" | 19/8" TO 21" | 23/8" TO 25" |
| P3               |            | 5/8"       | 7/8"         | 9 3/4"       | 12"          | 14 3/8"      |



CHAIN POWER  
7TR33



MITER GEAR CONTROL FOR VERT. SHAFT.  
VERT. HAND WHEEL STANDARD.  
PERMANENT OR REMOVABLE CRANK OPTIONAL.



CRANK PERMANENT OR REMOVABLE  
CONTROL FOR VERT. SHAFT

# THORN

STEEL WINDOWS

## TYPICAL DETAILS

# RACK AND PINION OPERATOR

J. S. THORN CO.

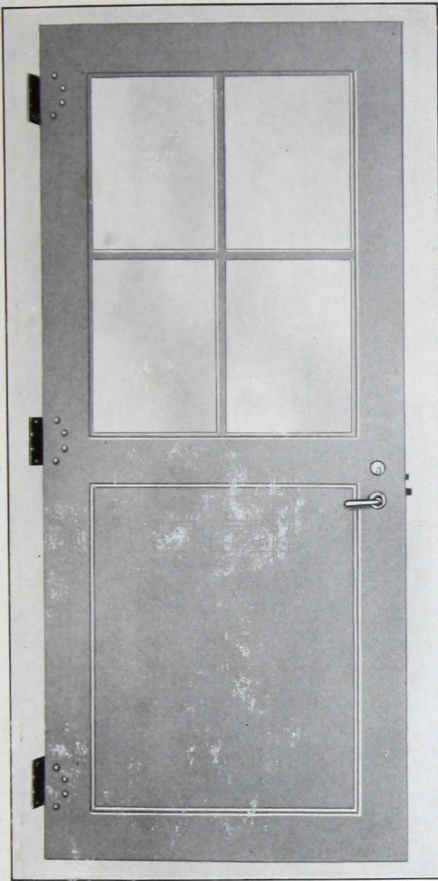
PHILADELPHIA, PA.

T.O.-1

7-36



## THORN INDUSTRIAL STEEL DOORS

*Specifications*

All doors where marked on drawings shall be Thorn Industrial type made of rectangular steel stiles formed on No. 14 Ga. steel plate and welded at the corners.

All stiles shall be  $1\frac{3}{4}$  inches x 5 inches.

The doors shall be arranged with plate panels in the lower section and to receive glass in the upper section as shown on the drawings. Angle beads to hold the glass shall be fitted at the factory.

Hardware shall be fitted at the factory and shall include necessary heavy duty locks and hinges for swing doors or track and hangers for sliding doors.

Frames for hinged doors and structural steel and jamb flashing for sliding doors shall be furnished under another heading.

All doors shall receive a priming coat of grey metallic paint at the factory before shipping.

Thorn Industrial Doors are of rugged construction and are adaptable to all types of industrial buildings.

They are made up of No. 14 Ga. steel plate formed into one piece rectangular stiles  $1\frac{3}{4}$  inches x 5 inches with projecting stop for glass or plate panel. The stiles are formed under heavy pressure and bends are sharp and accurate. They are welded into one piece at all joints and ground to a smooth finish. They are fitted with angle stops for holding glass in the upper panel and with a solid plate in the lower panel.

Reinforcing plates are applied to door stiles under hinges to provide a heavy metal backing and to give hinge screws extra tap thread.

Industrial doors are made in standard sizes, both hinged and sliding and are provided with suitable hardware which includes hinges or heavy track and hanger. Cylinder locks, Latches and Chain and foot bolts of substantial construction are ordinarily furnished with the doors, but it must be distinctly specified that this hardware is to be furnished. Our details show  $\frac{5}{8}$ " clearance at the sill, which is standard industry practice. However, in cases where less clearance is desired, we recommend lowering door frame and door to desired clearance but not less than  $\frac{3}{8}$ ". Standard  $\frac{5}{8}$ " clearance permits use of  $\frac{1}{2}$ " threshold.

Door frames are usually furnished by steel contractor and we do not include these, unless so specified and mentioned in our quotation. They are ordinarily made of steel channels of suitable size with door stop attached or we can furnish these in heavy steel plate formed in one piece with door stop.

Structural steel for the support of track and jamb flashing are not furnished by us.

All doors are painted at the factory with a priming coat of grey metallic paint.

In order to avoid any misunderstanding as to the determination of the "outside" or "keyside" of a door it is well to note the following:

*Entrance doors*—outside is the street side.

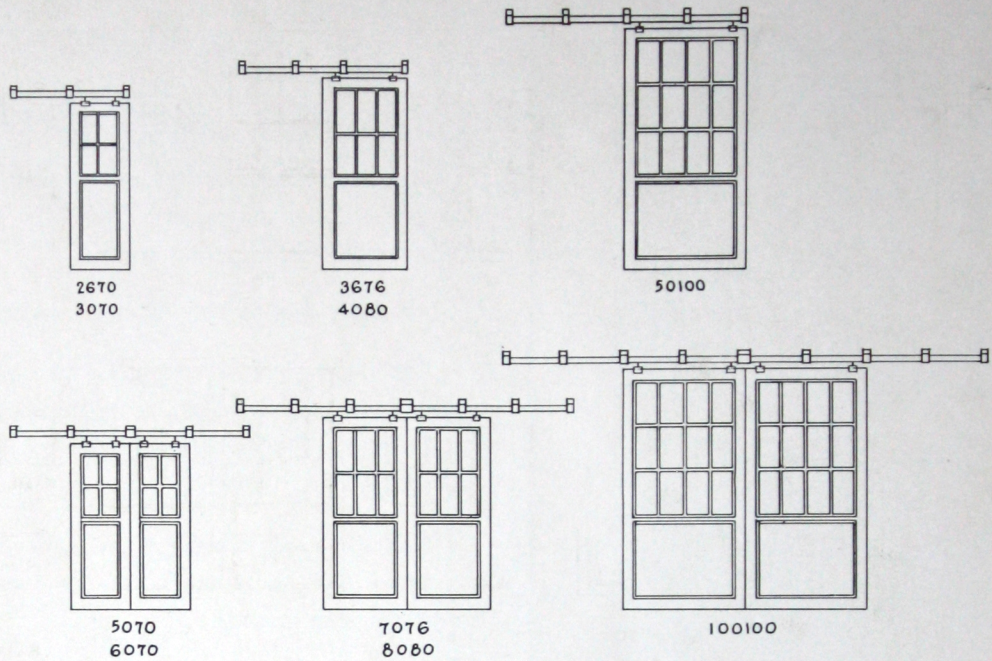
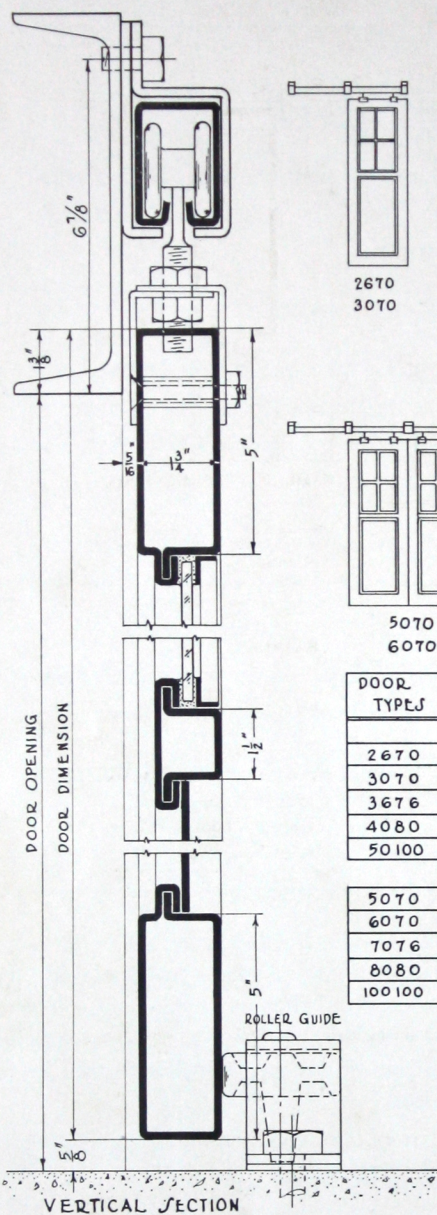
*Room doors*—outside is the corridor side.

*Communicating doors*—outside is the side on which the butts are not visible when door is closed.

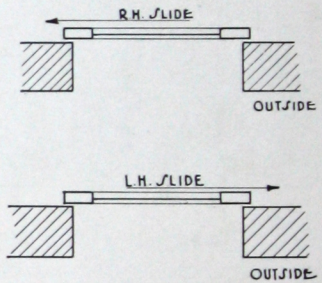
*Closet doors*—outside is the room side.

*Twin doors*—outside is the side on which the doors face each other.





| DOOR<br>TYPES | SIZE OF DOOR |            | SIZE OF OPENING |            | GLASS<br>SIZES |
|---------------|--------------|------------|-----------------|------------|----------------|
|               | WIDTH        | HEIGHT     | WIDTH           | HEIGHT     |                |
| SINGLE DOORS  |              |            |                 |            |                |
| 2670          | 2'-5 3/8"    | 6'-11 1/4" | 2'-3"           | 6'-10 1/2" | 9 1/2" x 16"   |
| 3070          | 2'-11 5/8"   | 6'-11 1/4" | 2'-9"           | 6'-10 1/2" | 12 1/2" x 16"  |
| 3676          | 3'-5 5/8"    | 7'-5 1/4"  | 3'-3"           | 7'-4 1/2"  | 10 1/4" x 19"  |
| 4080          | 3'-11 5/8"   | 7'-11 1/4" | 3'-9"           | 7'-10 1/2" | 12 1/4" x 22"  |
| 50100         | 4'-11 5/8"   | 9'-11 1/4" | 4'-9"           | 9'-10 1/2" | 12" x 22"      |
| DOUBLE DOORS  |              |            |                 |            |                |
| 5070          | 2-2'-5 3/8"  | 6'-11 1/4" | 4'-9"           | 6'-10 1/2" | 9 1/2" x 16"   |
| 6070          | 2-2'-11 5/8" | 6'-11 1/4" | 5'-9"           | 6'-10 1/2" | 12 1/2" x 16"  |
| 7076          | 2-3'-5 5/8"  | 7'-5 1/4"  | 6'-9"           | 7'-4 1/2"  | 10 1/4" x 19"  |
| 8080          | 2-3'-11 5/8" | 7'-11 1/4" | 7'-9"           | 7'-10 1/2" | 12 1/4" x 22"  |
| 100100        | 2-4'-11 5/8" | 9'-11 1/4" | 9'-9"           | 9'-10 1/2" | 12" x 22"      |



#### SPECIFICATION

LIGHT INDUSTRIAL DOORS; STILES, RAILS AND PANELS ARE OF 14 GAUGE STEEL.  
HEAVY INDUSTRIAL DOORS; STILES AND RAILS NO. 13 GA. PANELS OF NO. 12 GA. STEEL

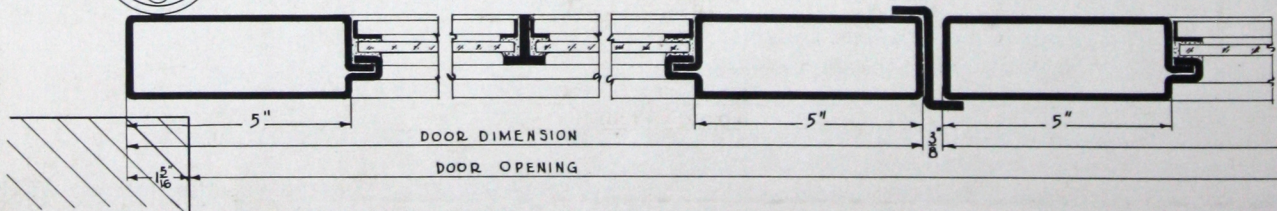
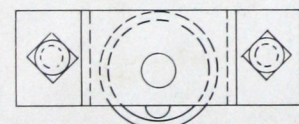
#### HARDWARE

STANDARD EQUIPMENT, TRACK, HANGERS, ROLLER, GUIDES, HASP AND STAPLE, DOOR STOPS, AND PULLS.

EXTRA EQUIPMENT (FURNISHED ONLY WHEN SPECIFIED) CYLINDER LOCKS.

#### NOTE

STRUCTURAL FRAMING AND FLASHING NOT FURNISHED BY THORN



**THORN**  
STEEL DOORS

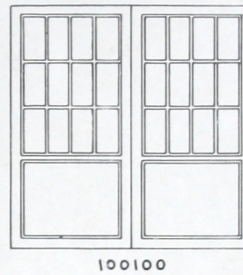
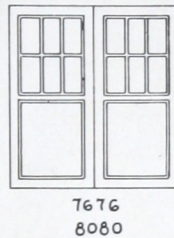
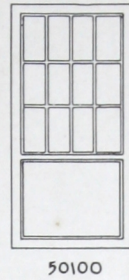
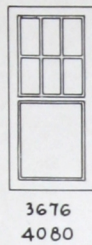
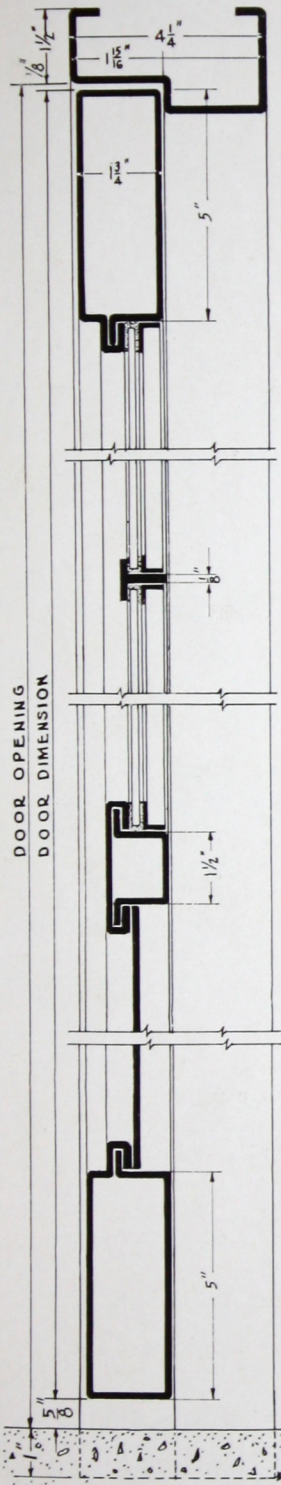
SLIDING INDUSTRIAL STEEL DOORS

TD-2

JANUARY

1936





| DOOR<br>TYPES | SIZE OF DOOR |            | SIZE OF OPENING |        | GLASS<br>SIZES |
|---------------|--------------|------------|-----------------|--------|----------------|
|               | WIDTH        | HEIGHT     | WIDTH           | HEIGHT |                |
| SINGLE DOORS  |              |            |                 |        |                |
| 2670          | 2'-5 5/8"    | 6'-11 1/4" | 2'-6"           | 7'-0"  | 9 1/2" x 16"   |
| 3070          | 2'-11 5/8"   | 6'-11 1/4" | 3'-0"           | 7'-0"  | 12 1/2" x 16"  |
| 3676          | 3'-5 3/8"    | 7'-5 1/4"  | 3'-6"           | 7'-6"  | 10 1/4" x 19"  |
| 4080          | 3'-11 3/8"   | 7'-11 1/4" | 4'-0"           | 8'-0"  | 12 1/4" x 22"  |
| 50100         | 4'-11 3/8"   | 9'-11 1/4" | 5'-0"           | 10'-0" | 12" x 22"      |
| DOUBLE DOORS  |              |            |                 |        |                |
| 5070          | 2-2'-5 5/8"  | 6'-11 1/4" | 5'-0"           | 7'-0"  | 9 1/2" x 16"   |
| 6070          | 2-2'-11 5/8" | 6'-11 1/4" | 6'-0"           | 7'-0"  | 12 1/2" x 16"  |
| 7076          | 2-3'-5 3/8"  | 7'-5 1/4"  | 7'-0"           | 7'-6"  | 10 1/4" x 19"  |
| 8080          | 2-3'-11 3/8" | 7'-11 1/4" | 8'-0"           | 8'-0"  | 12 1/4" x 22"  |
| 100100        | 2-4'-11 3/8" | 9'-11 1/4" | 10'-0"          | 10'-0" | 12" x 22"      |

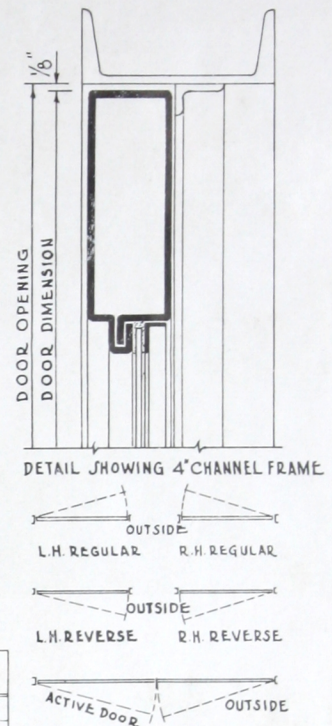
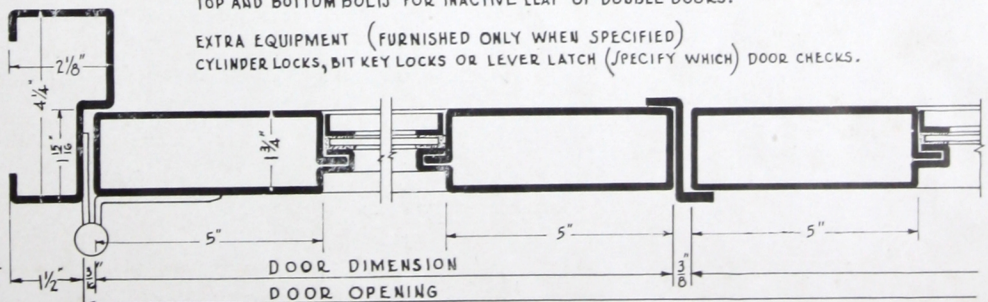
SPECIFICATION

LIGHT INDUSTRIAL DOORS, STILES, RAILS, PANELS AND PRESSED STEEL FRAMES NO. 14 GA. STEEL.

HEAVY INDUSTRIAL DOORS, STILES AND RAILS NO. 13 GA. STEEL, PANELS NO. 12 GA. STEEL. FRAMES 4" STRUCTURAL CHANNEL.

HARDWARE, STANDARD EQUIPMENT - HINGES HEAVY STEEL HALF SURFACE BUTTS, TOP AND BOTTOM BOLTS FOR INACTIVE LEAF OF DOUBLE DOORS.

EXTRA EQUIPMENT (FURNISHED ONLY WHEN SPECIFIED)  
CYLINDER LOCKS, BIT KEY LOCKS OR LEVER LATCH (SPECIFY WHICH) DOOR CHECKS.



SPECIFY WHICH DOOR IS ACTIVE, ALSO THE HAND OF DOOR.

THE HAND OF DOOR IS DETERMINED FROM THE OUTSIDE OR KEY SIDE OF DOOR. THIS INFORMATION SHOULD ALWAYS BE GIVEN DOOR FRAMES FURNISHED ONLY WHEN SPECIFIED

THORN  
STEEL DOORS

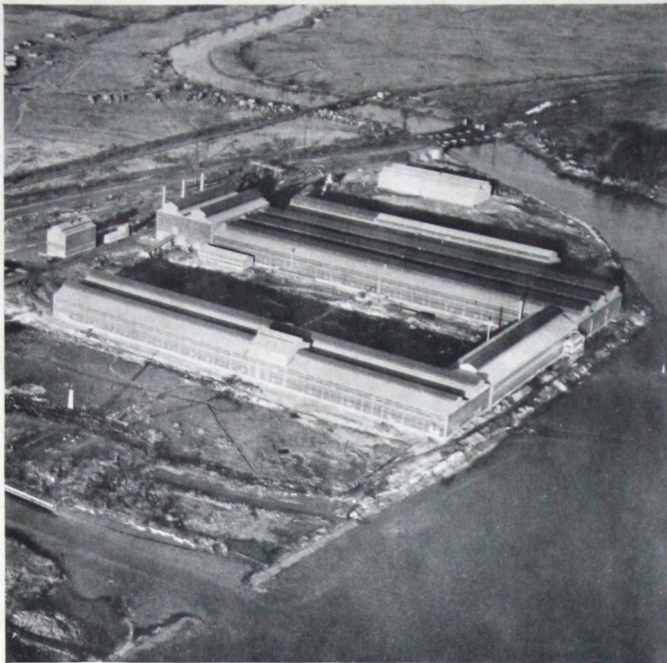
HINGED TYPE  
INDUSTRIAL DOORS

TD-1

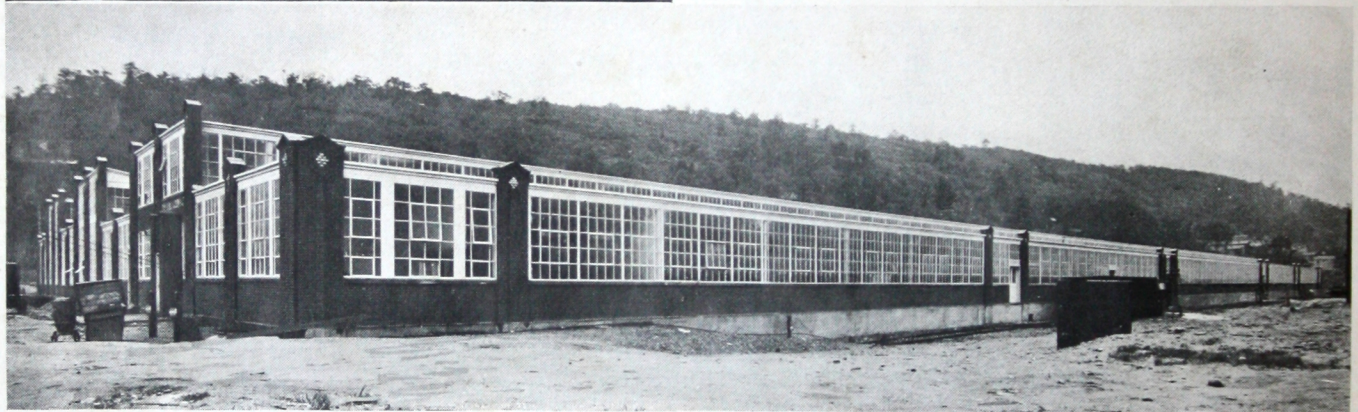
JANUARY

1936





GENERAL STEEL CASTINGS CORP.  
EDDYSTONE, PA.  
W. R. CHAMBERS, ENGR.  
THORN INDUSTRIAL PRODUCTS USED:—  
210,000 SQ. FT. PIVOTED WINDOWS  
160,000 SQ. FT. CONTINUOUS WINDOWS  
30,000 LIN. FT. TENSION OPERATORS



HALL CHINA COMPANY  
EAST LIVERPOOL, OHIO  
B. H. PRACK, PITTSBURGH, ARCHITECT AND ENGINEER



MC CANN & COMPANY  
PITTSBURGH  
B. H. PRACK, PITTSBURGH, ARCHITECT AND ENGINEER







# THORN

STEEL WINDOWS